BIG BEAR DATSUN

MARUI PLASTIC MODEL

1/12 RADIO CONTROL CAR

With tuning motor

○ READY TO ASSEMBLE R/C CAR MODEL KIT ○ WITH HIGH POWER BLACK MOTOR

Electrically Powered,
Radio Controlled

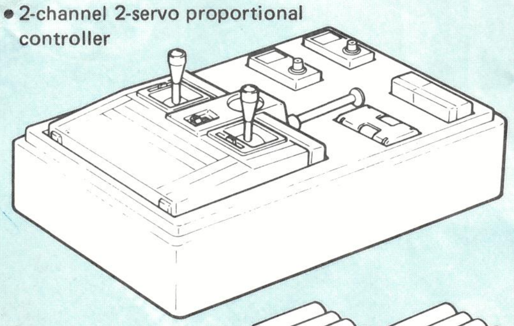
DM

TOKYO MARUI PLASTIC MODEL CO.

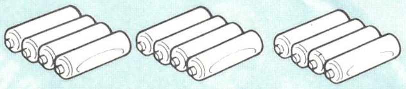
HIGH PERFORMANCE SUPER BIG WHEEL R/C CAR

《 Parts not included in the kit 》

- 2-channel 2-servo proportional controller

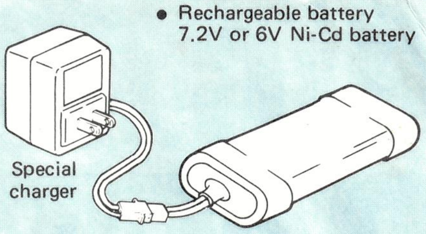


Most regular 2-channel proportional controllers may be used, but always test first. For those who are going to purchase a controller, the following models are recommended:
FUTABA: ATTACK, MAGNUM
K.O.: FX-II, EX-II
J.P.: BEAT 2
SANWA: NEW DASH S



- Batteries for proportional controller

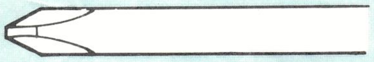
- Rechargeable battery
7.2V or 6V Ni-Cd battery



Either 7.2V or 6 V Ni-Cd battery may be used as the power supply for drive motor. A 6 V battery, however, will not deliver the full speed and torque designed into the BIG BEAR model, so we recommend a 7.2 V racing pack for those who are going to purchase a new battery.
A Ni-Cd battery may be recharged up to 300 times. Charging normally requires 15 to 16 hours, but quick-charge models requiring only 15 to 20 minutes are also available.
*Refer to the instructions included with the Ni-Cd battery for details.

《 Tools Required h for Assr for Assembly 》

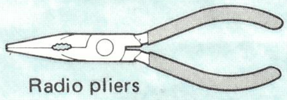
⊕ Only phillips type screwdrivers are shown in actual sizes.



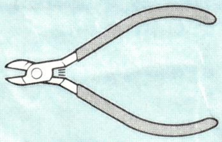
+ Screwdriver (Large) for $\phi 3$ screws and $\phi 3$ tapping screws

+ Screwdriver (Middle) for damper shaft, $\phi 2.6$ screws, and $\phi 2.6$ tapping screws

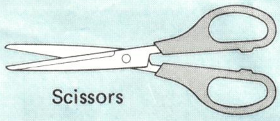
This kit includes many tapping screws. Use the proper screwdriver and the proper tightening torque for each one. Release the turning pressure on the screwdriver when the screw no longer rotates easily. Be careful not to damage screws by applying too much torque.



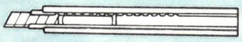
Radio pliers



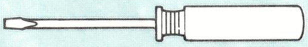
Cutting pliers



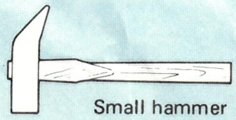
Scissors



Cutter

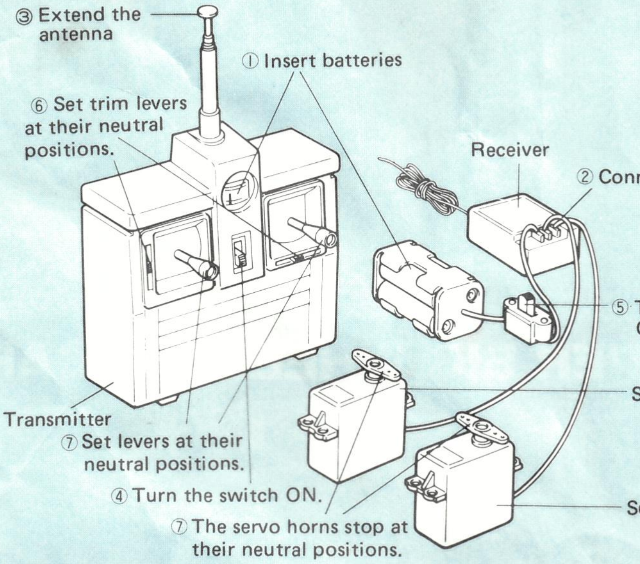


Plain screwdriver (Middle)



Small hammer

《 Radio Control Unit 》



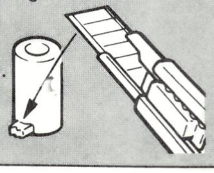
Almost any 2-channel, 2-servo, digital proportional radio controller may be used, but some may not. Units with 3 or more channels are not suitable.

* Check the controller operation

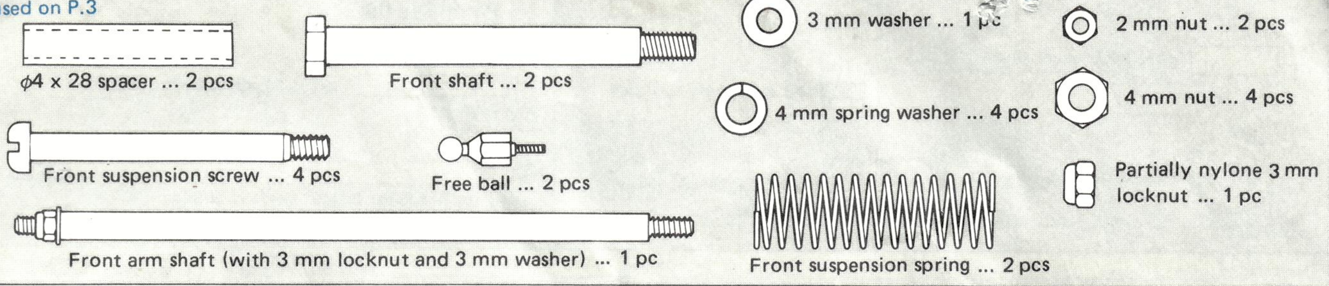
① Insert batteries in the transmitter and receiver.
② Connect the servo and power supply leads to the receiver.
③ Extend the transmitter antenna.
④ Turn ON the transmitter switch. (Always turn ON the transmitter switch first.)
⑤ Turn ON the receiver switch.
⑥ Set the trim levers at their neutral positions.
⑦ Set the levers at their neutral positions. (The servo horns should stop at their neutral positions.)
⑧ Check servoes operation by moving the levers.
⑨ Turn OFF the receiver first and then the transmitter when the test is complete.
Refer to the radio control equipment instructions for further details.

Read the following instructions carefully before assembly

- Read the entire assembly instructions before beginning assembly.
- A <グリス mark indicates a portion where the grease included in the kit must be applied. Similarly, a small hammer should be used when the ⊢ mark appears.
- Some screws, nuts, and washers will be left over as more than the required numbers are included in the kit. Keep them for use as spare parts.
- Thoroughly remove plastic part burrs using a cutter.
- Strenghened nylon part burrs must be completely removed as they may impair driving performance. (Be careful not to cut your fingers with the cutter.)



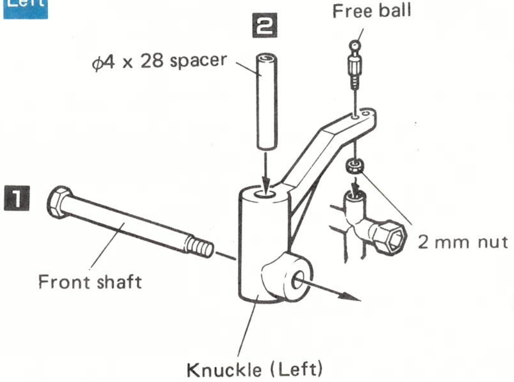
Metallic part actual sizes used on P.3

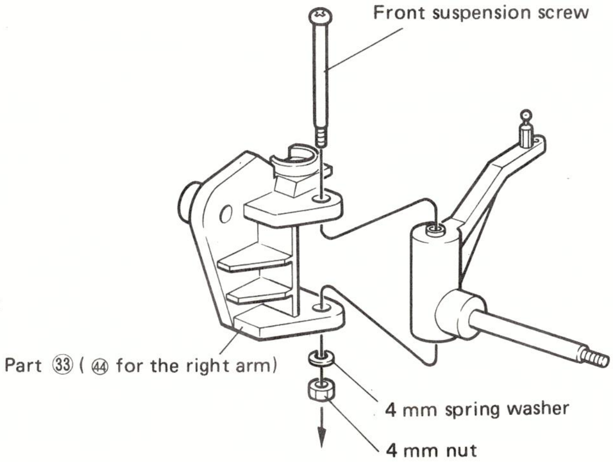


1 Front suspension arm assembly

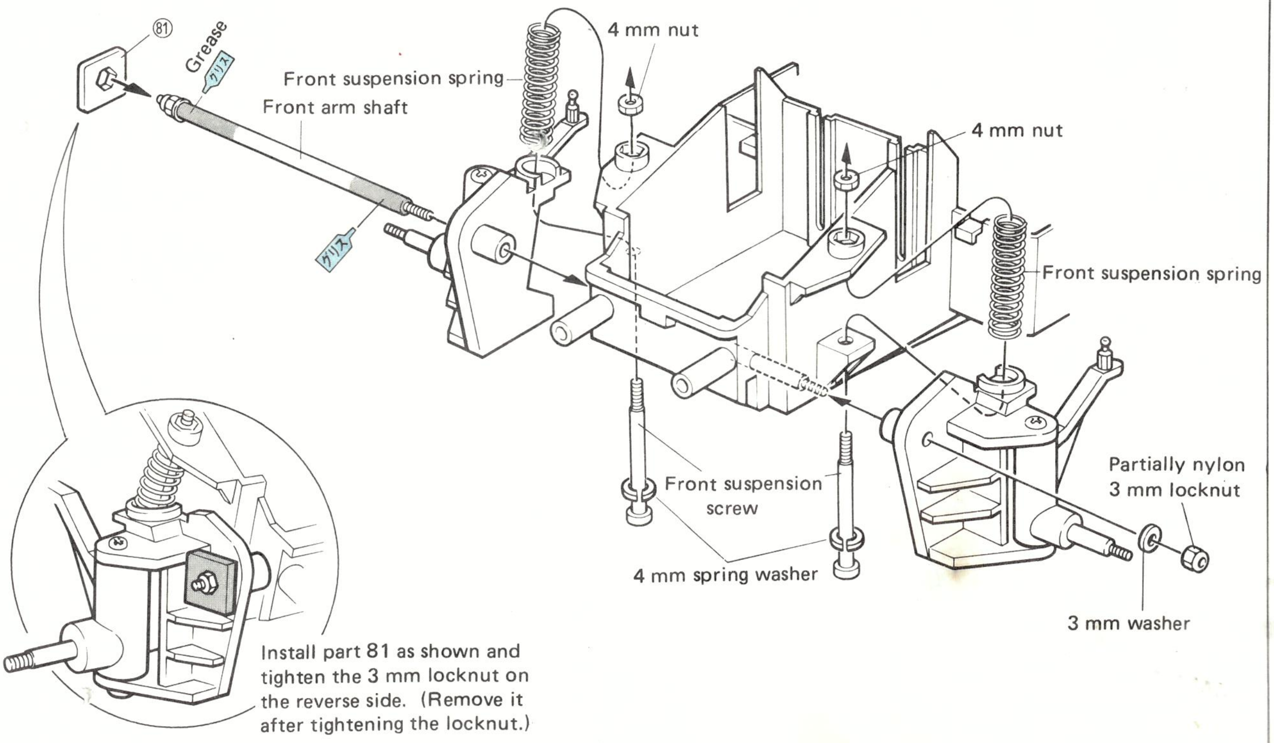
1 2 (Install in the order (1) and (2).)

Left

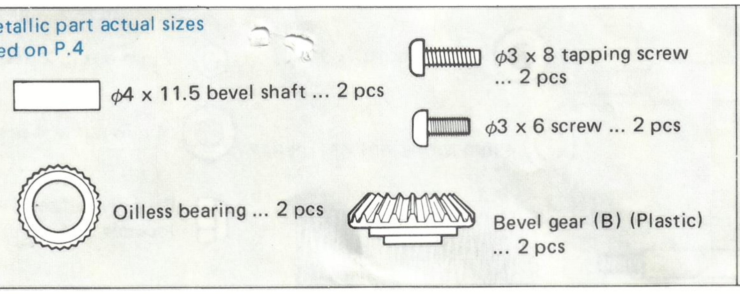




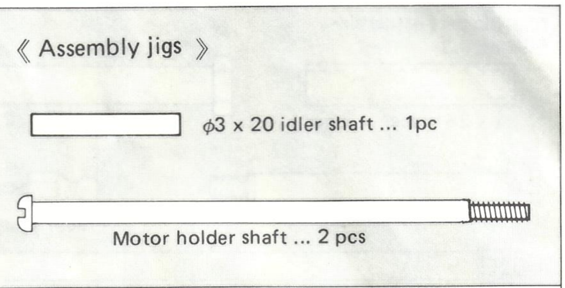
2 Front suspension arm installation



Metallic part actual sizes used on P.4

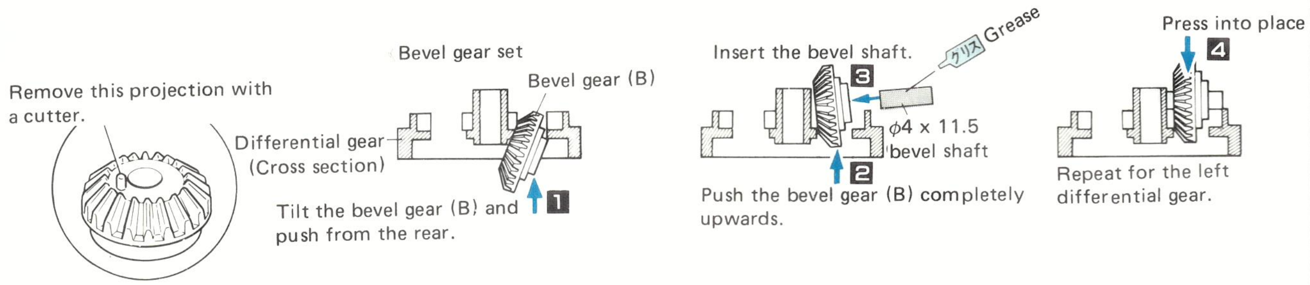


《 Assembly jigs 》

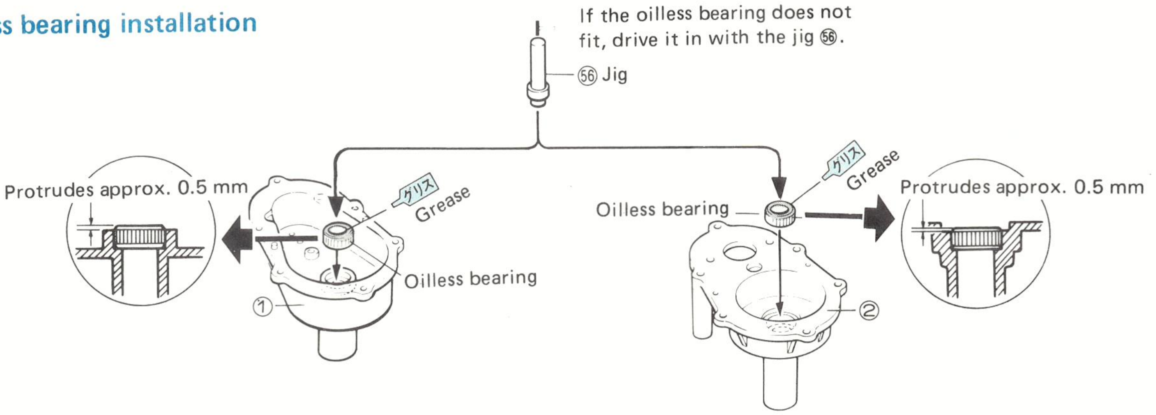


3 Gear assembly

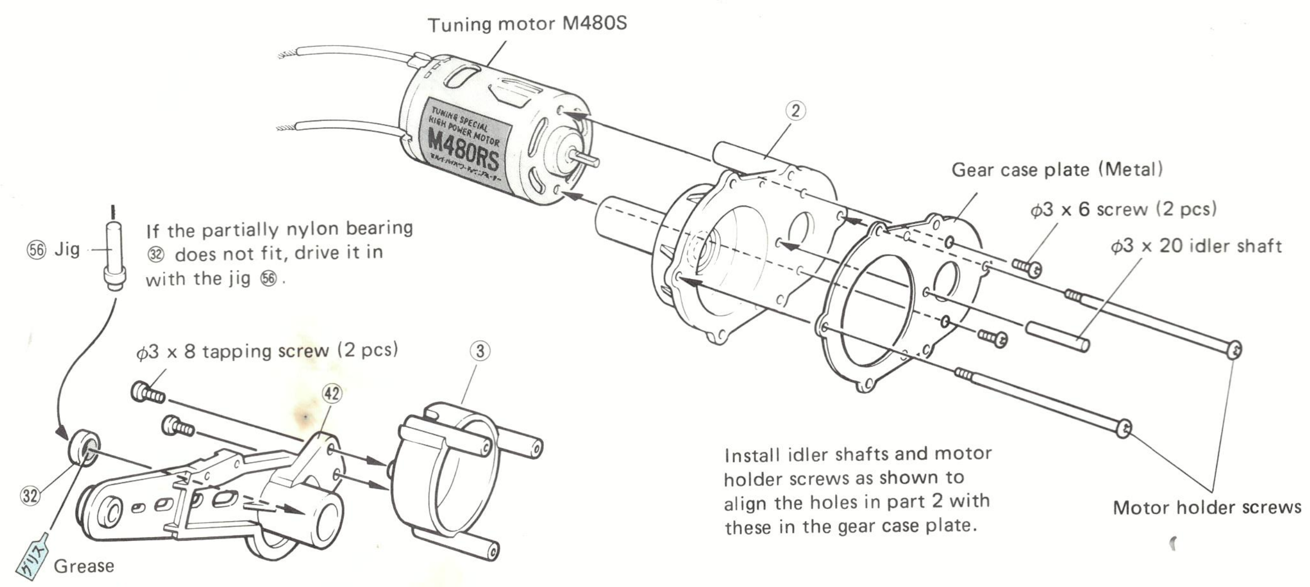
1 ~ 4 (Assemble in the order (1) through (4).)



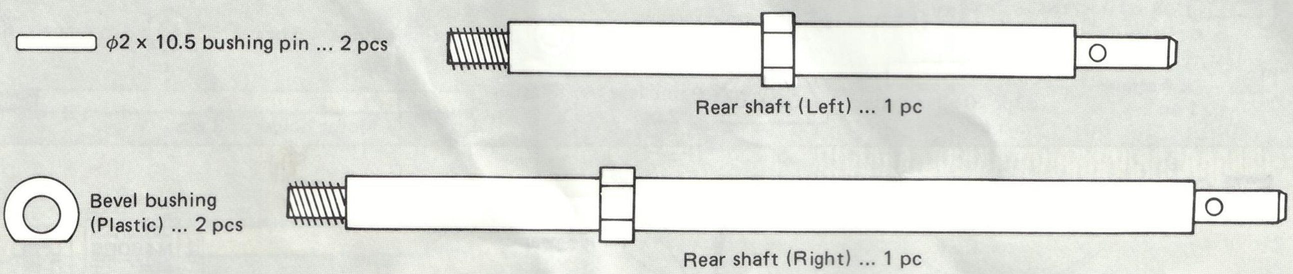
4 Oilless bearing installation



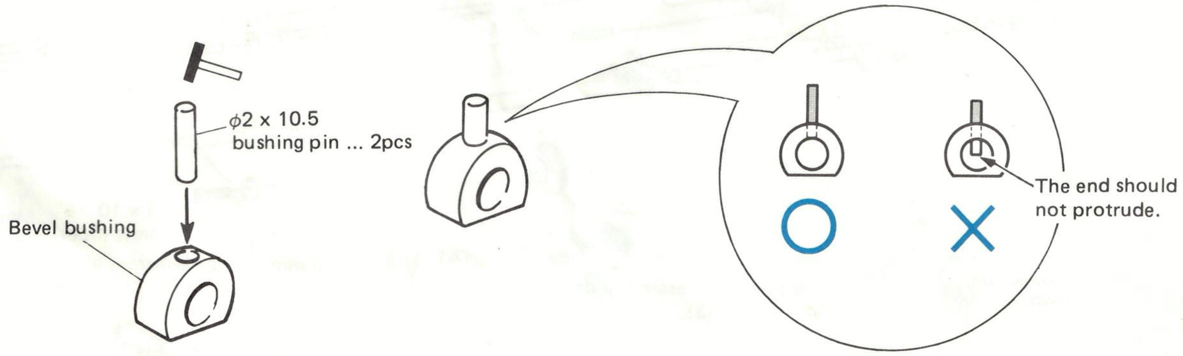
5 Motor assembly



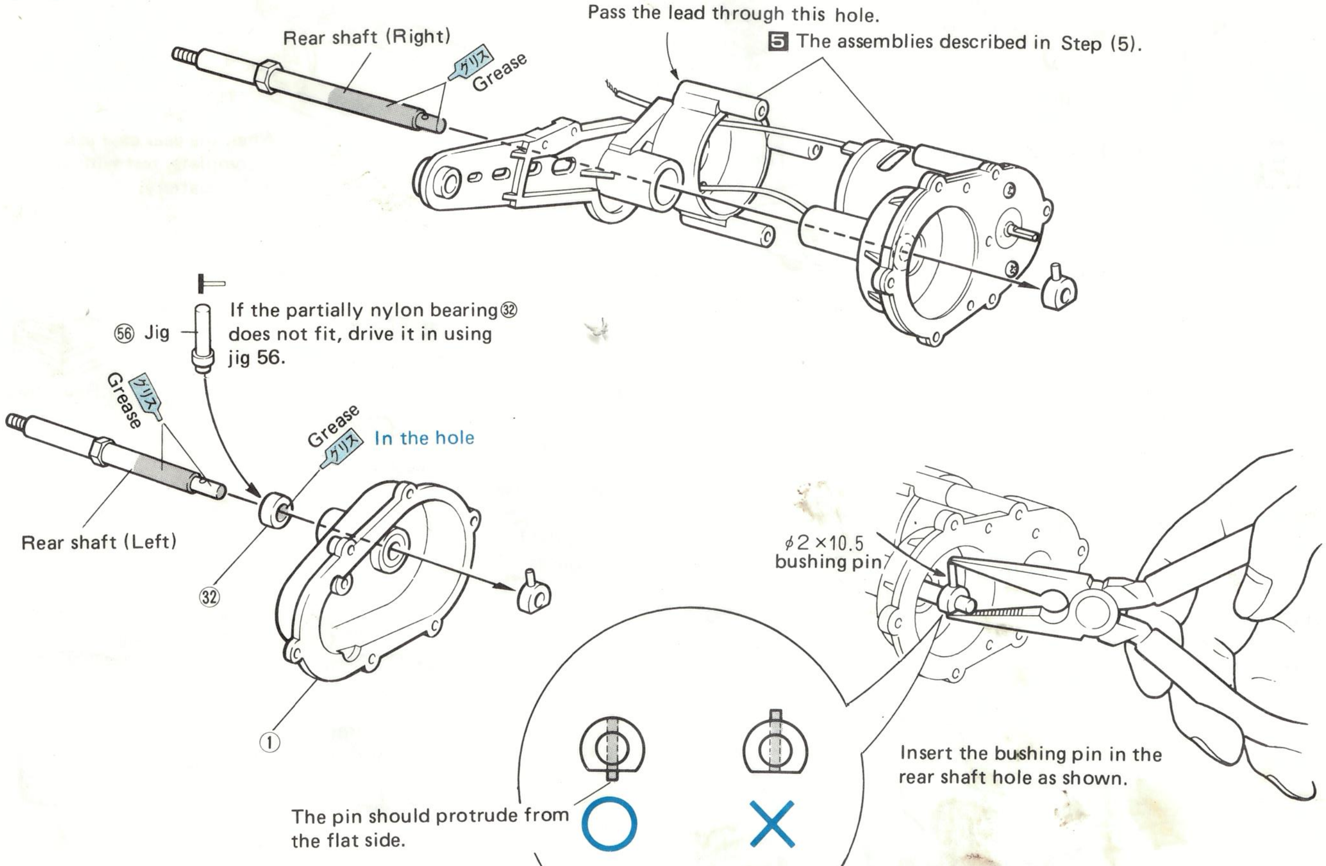
Metallic part actual sizes used on P.5



6 Temporary setting of bevel bushing



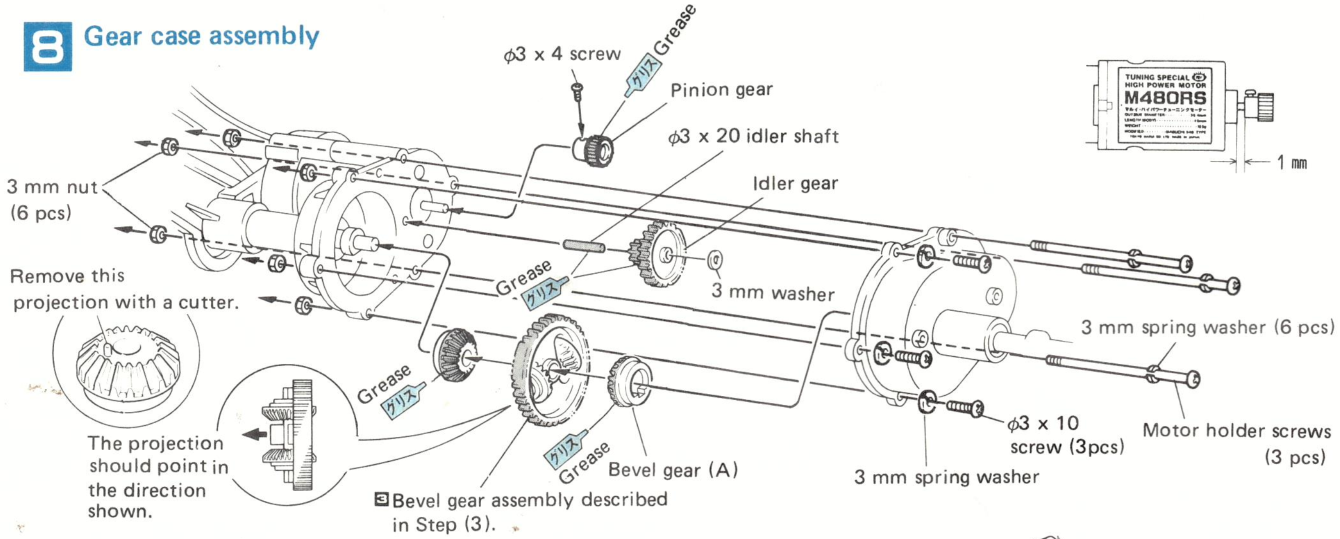
7 Rear shaft assembly

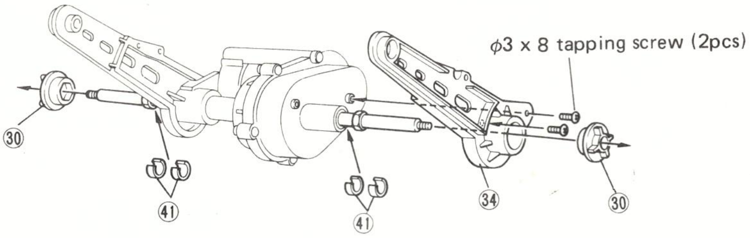


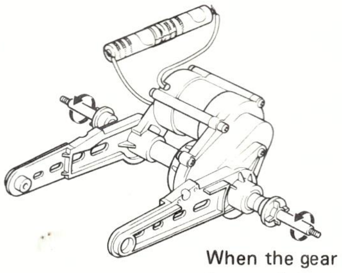
Metallic part actual sizes used on P.6

- ϕ3 x 10 screws ... 3 pcs
- ϕ3 x 4 screws ... 1 pc
- ϕ3 x 8 tapping screw ... 2 pcs
- ϕ2 x 9 tapping screws ... 16 pcs
- ϕ3 x 20 idler shaft ... 1 pc
- Bevel gear (A) (Plastic) .. 2 pcs
- 2 mm washer ... 16 pcs
- 3 mm spring washer ... 6 pcs
- 3 mm washer ... 1 pc
- 3 mm nut ... 6 pcs
- Motor holder ... 3 pcs

8 Gear case assembly



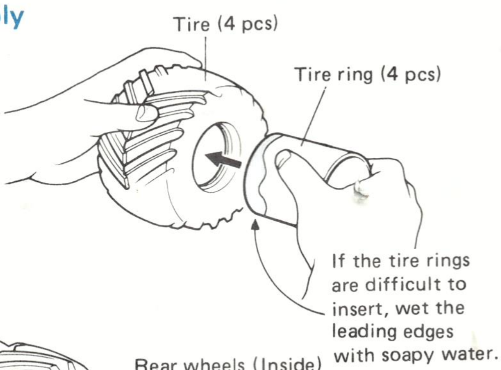


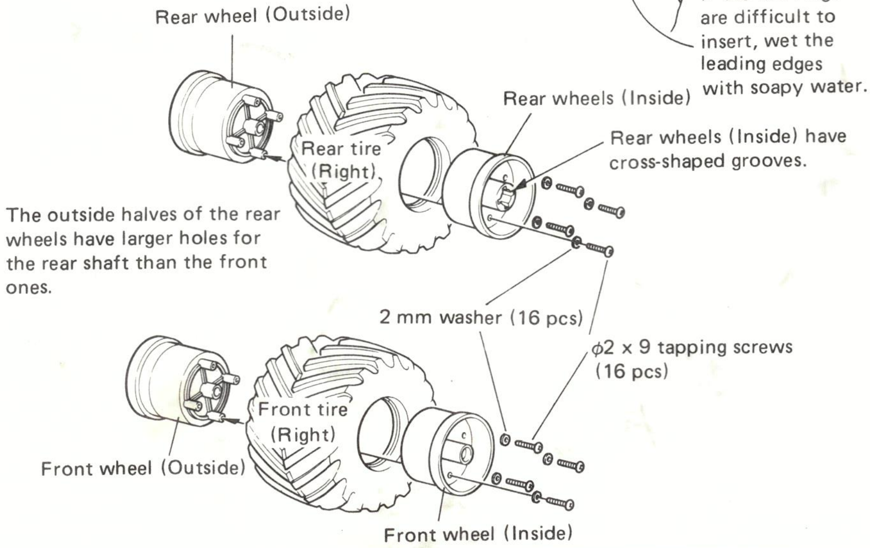


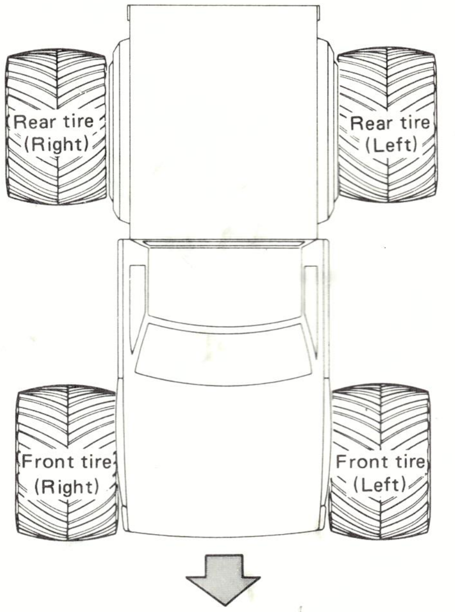
When the gear case assembly is complete, test with an 1.5V to 3 V battery.

9 Tire and wheel assembly

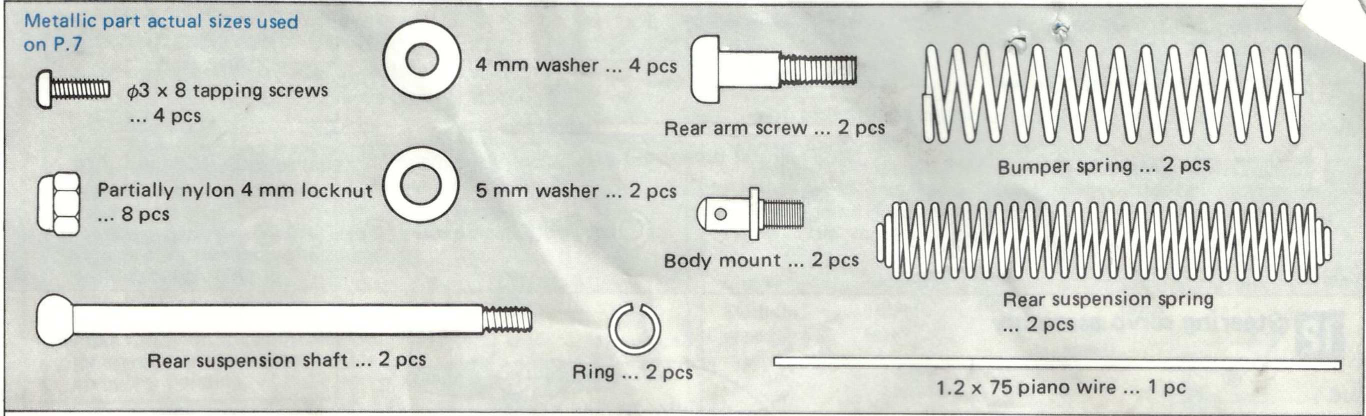
Be sure to install tires with the V-patterns pointing in the correct direction.



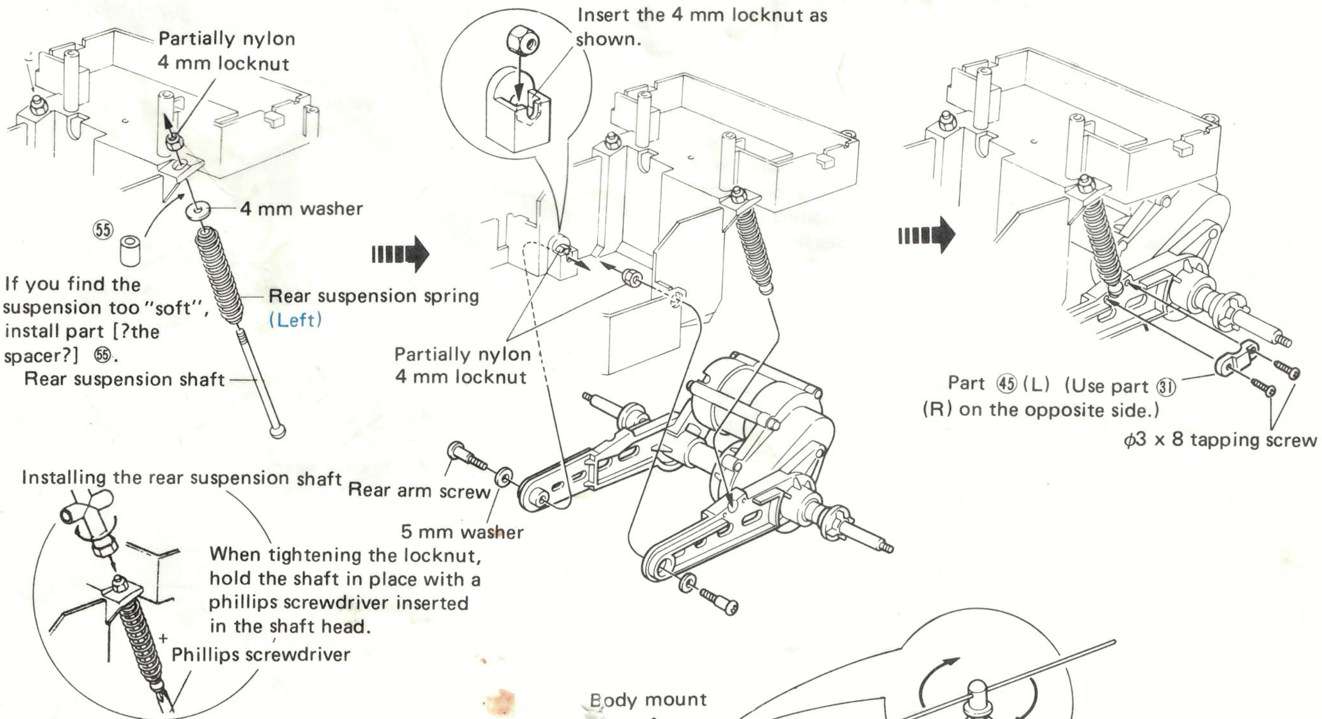




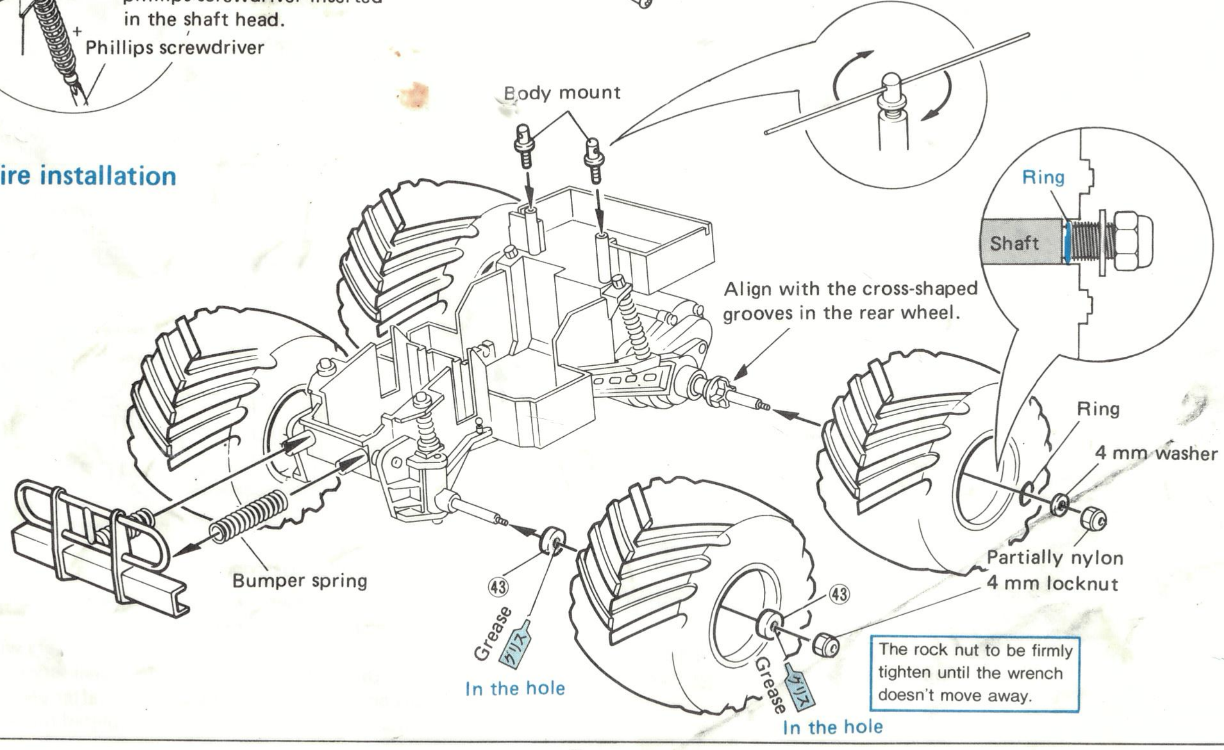
Make sure that the V-shaped tread patterns point forward as shown above. (If they are reversed, the car will not reach its full speed.)



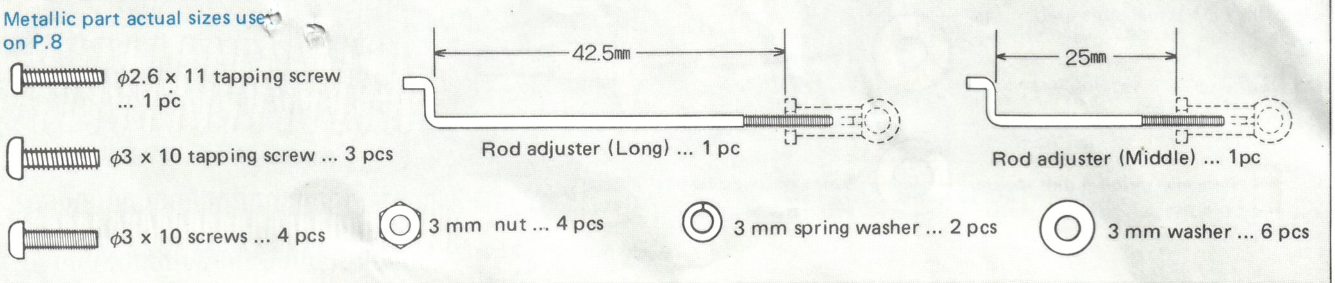
10 Rear suspension arm assembly



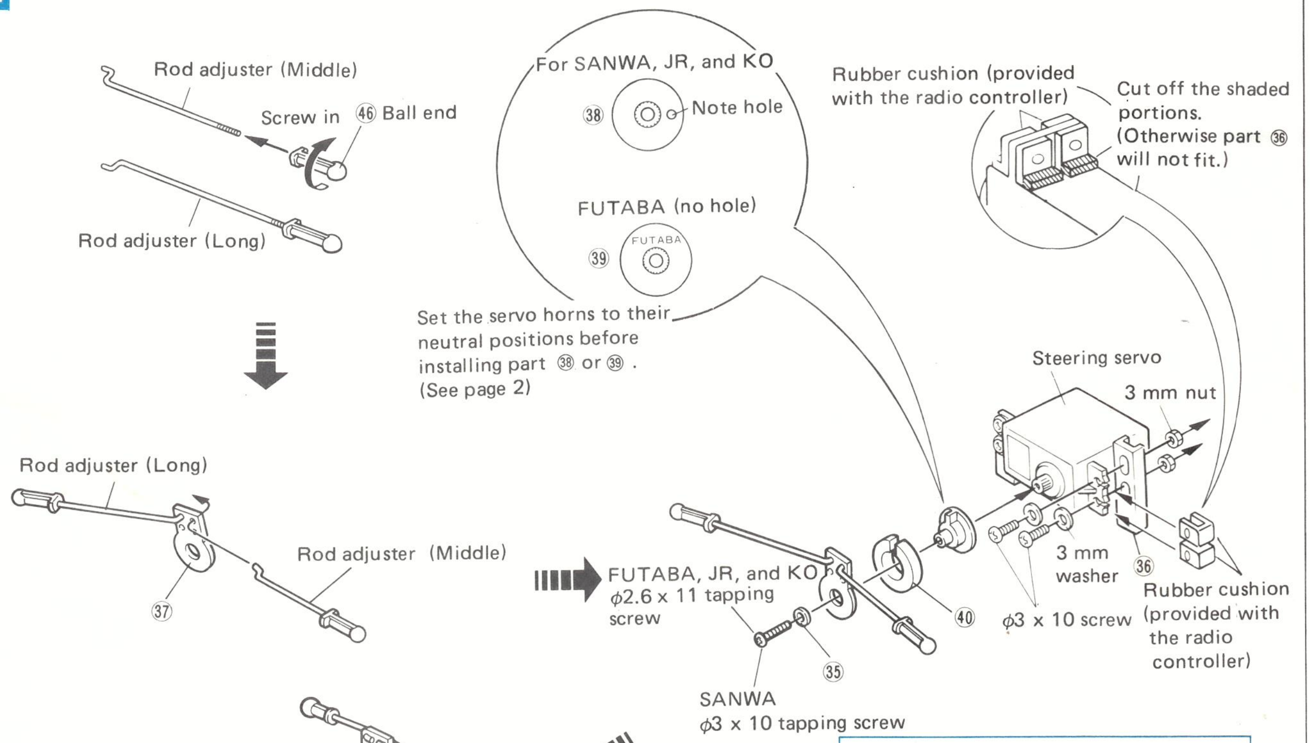
11 Tire installation

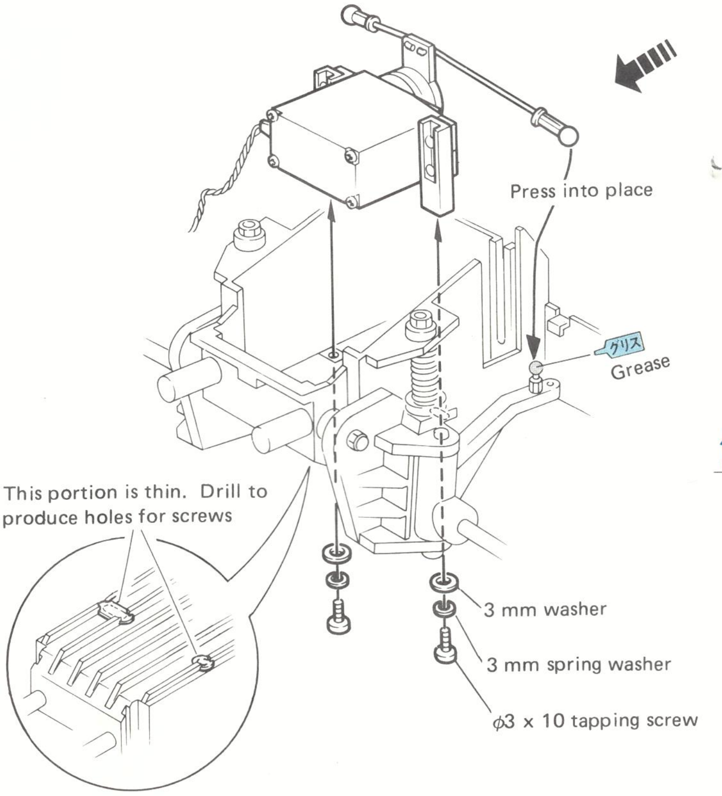


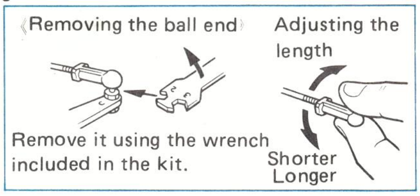
Metallic part actual sizes used on P.8

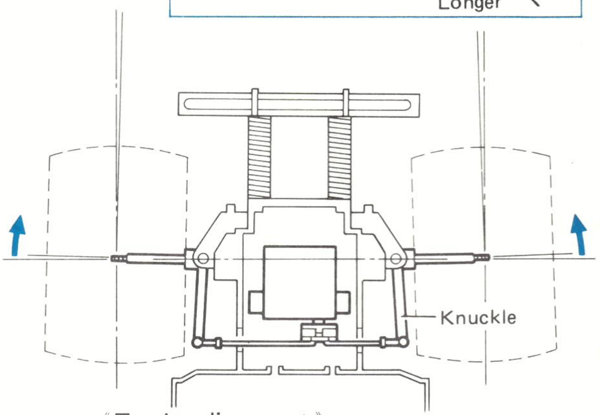


12 Steering servo assembly









《 Toe-in adjustment 》

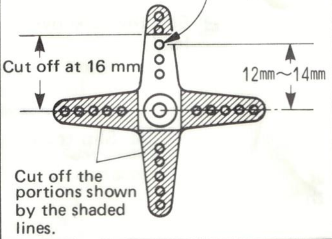
Tire toe-in improves the vehicle's straight travelling performance. Adjust the ball ends so that both knuckles (Right and Left) tilt slightly forwards. The length shown in Figure is only for reference since it differs with proportional servo. Adjust the toe-in after giving the completed model a test run.

13 Speed controller assembly

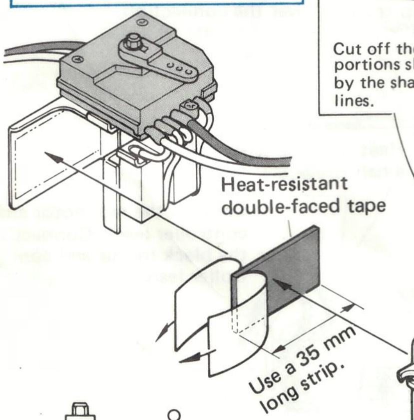
(Connect the two servos with the receiver during this assembly. (See p.2 for details.))

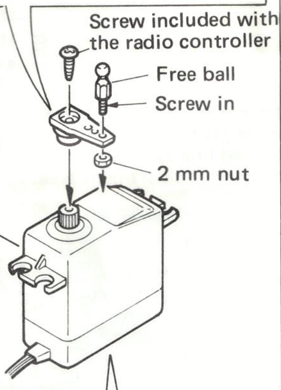
- Clean tape mounting areas with paint thinner for plastics or other suitable solvent.
- Do not touch the adhesive surface after removing the backing paper. (Oil on your fingers may reduce bonding strength.)
- Press firmly on the controller component to ensure complete bonding.

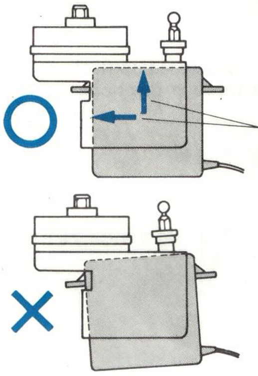
Servo horn (included with the radio controller)
Use a servo horn 12 to 14 mm from the center.



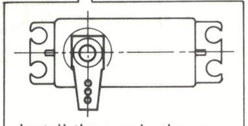
Cut off the portions shown by the shaded lines.





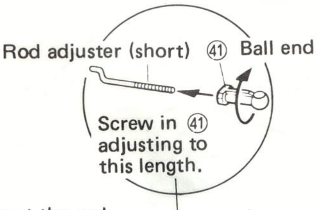


Press the servo toward arrows and affix to metal fittings tightly.

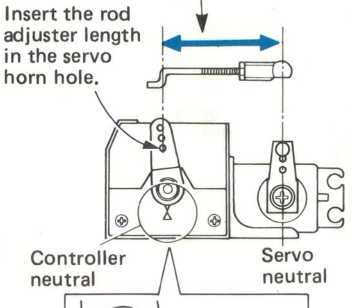


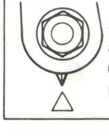
Install the arm in the neutral position, perpendicular to the servo as shown.

Install in the order of 1 through 4

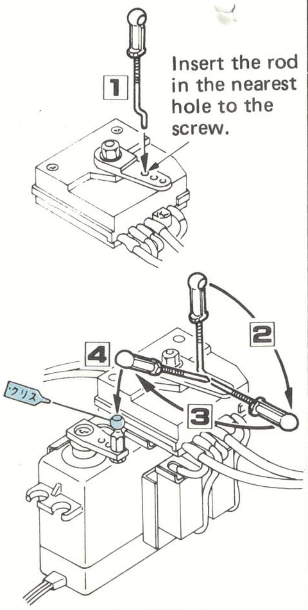


Insert the rod adjuster length in the servo horn hole.



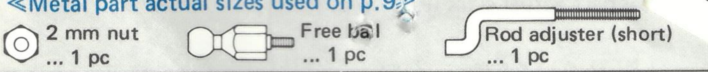


Aligning the arrows together shifts to neutral.



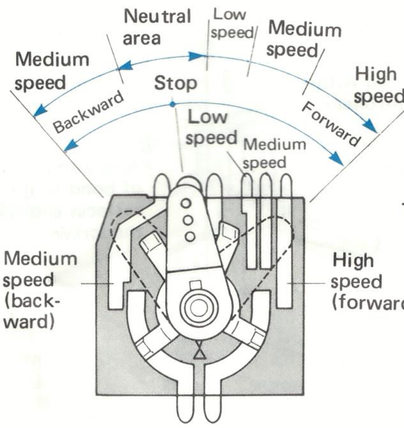
Insert the rod in the nearest hole to the screw.

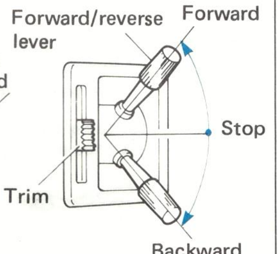
≪Metal part actual sizes used on p.9≫

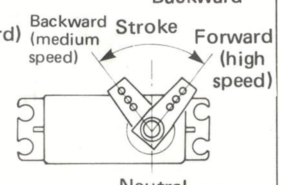


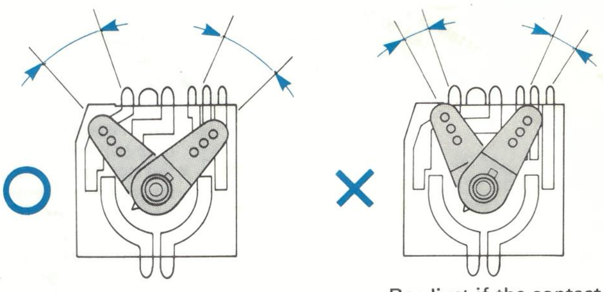
≪Stroke adjustment≫

- Servo horn stroke differs by servo type. Test to see if the switch arm moves all the way to its forward (high-speed) and reverse (high-speed) positions by moving the lever up and down.





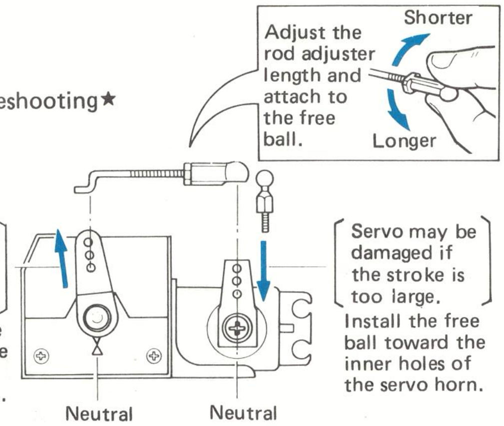




Sufficient contact overlap

Readjust if the contact overlap is insufficient.

★Troubleshooting★



Poor contact results from insufficient stroke.

Install the free ball toward the outer holes of the servo horn.

Servo may be damaged if the stroke is too large.

Install the free ball toward the inner holes of the servo horn.

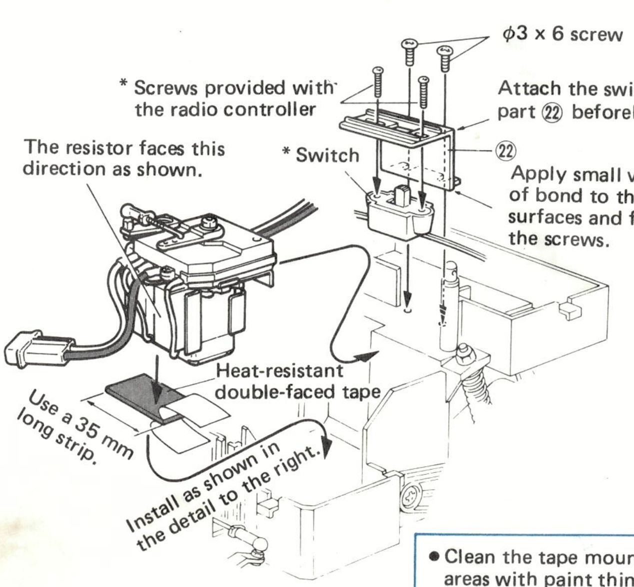
Handling Precautions

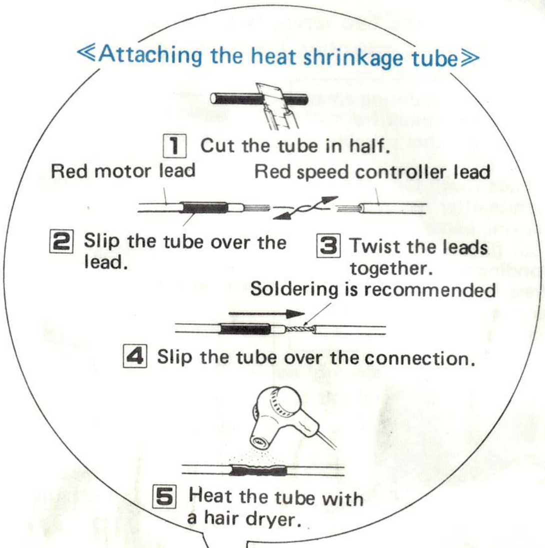
- The controller must frequently switch large electric currents, and may become damaged quickly if it is used incorrectly. Therefore, please observe the following precautions. The switch components should be considered as consumable items.
- Faulty controller installation, incorrect switch positions, or wire misplacement prevents switching into forward high speed, which cause the resistors to overheat and burn the printed circuit board.
- Do not touch the controller soon after operation as the resistors may be quite hot.
- Do not use the controller in a closed mechanical box as it contains heat generating resistors.

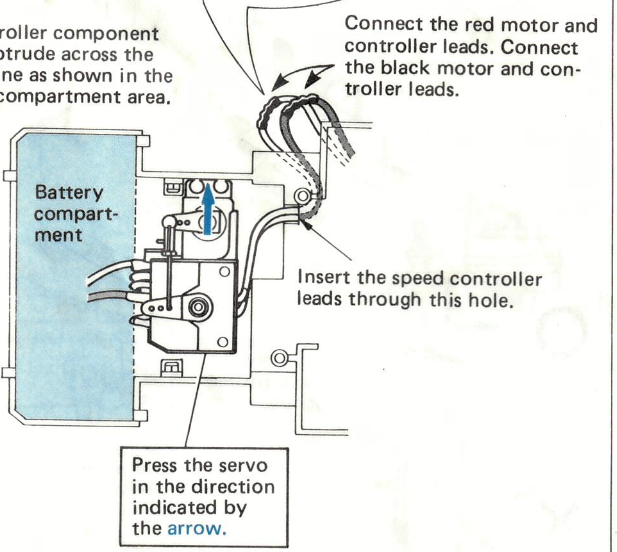
≪Metal part actual sizes used on p. 10≫

ϕ3 x 6 screw ... 2 pcs

14 Controller installation

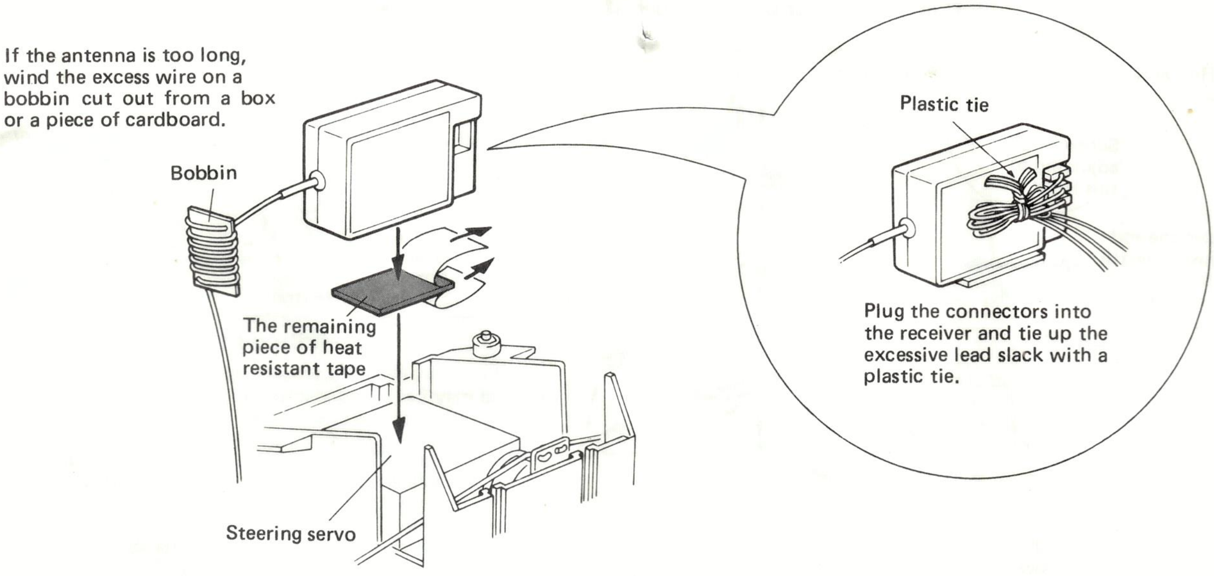






- Clean the tape mounting areas with paint thinner for plastics or other suitable solvent.
- Do not touch the adhesive surface after removing the backing paper. (Oil on your fingers may reduce bonding strength.)
- Press firmly on the controller servo to ensure complete bonding.

15 Receiver installation



Install the receiver on top of the steering servo.

16 Ni-Cd battery installation

≪Metal part actual sizes used on p.11≫

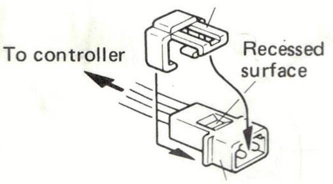
φ2 x 6.7 tapping screw ... 1 pc

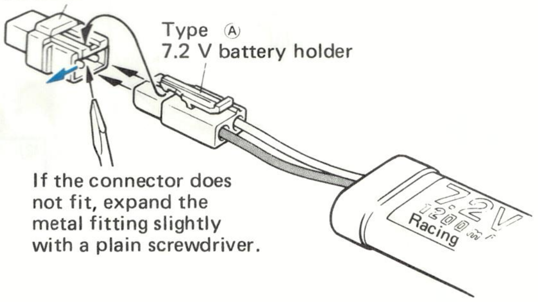
φ2 x 20 joint pipe ... 2 pcs

≪Before joining the connector≫ (6 V battery can be directly connected)

* The connectors on the 7.2 V battery come in two shapes as shown below.
Choose the controller connector to match.

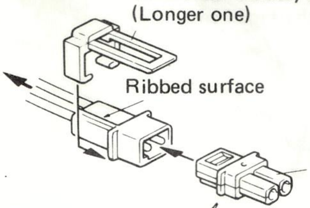
• Type Ⓐ

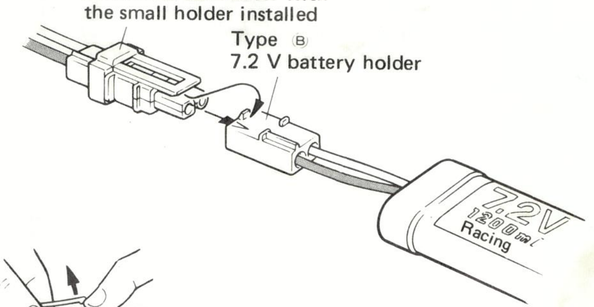


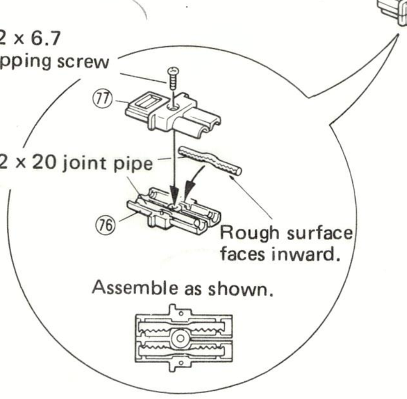


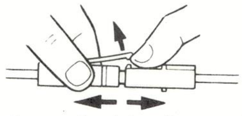
Always align the red leads on the two sides. Otherwise, the car will run in reverse.

• Type Ⓑ





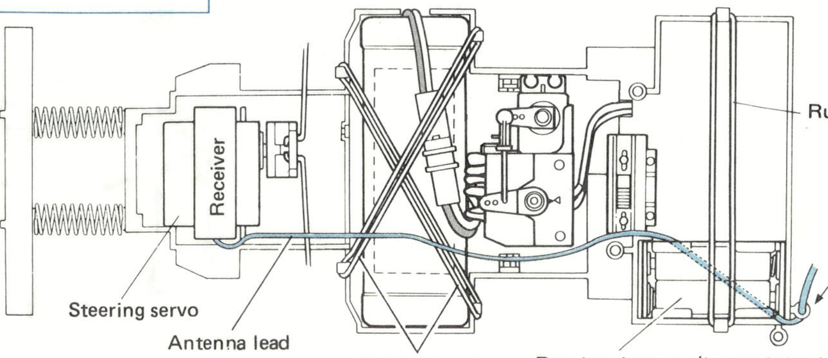




Lift the catch with a finger nail and pull to unplug the connector.

Cut out the thin portion to create an opening for the battery leads. (Not necessary when a 6 V battery is used.)

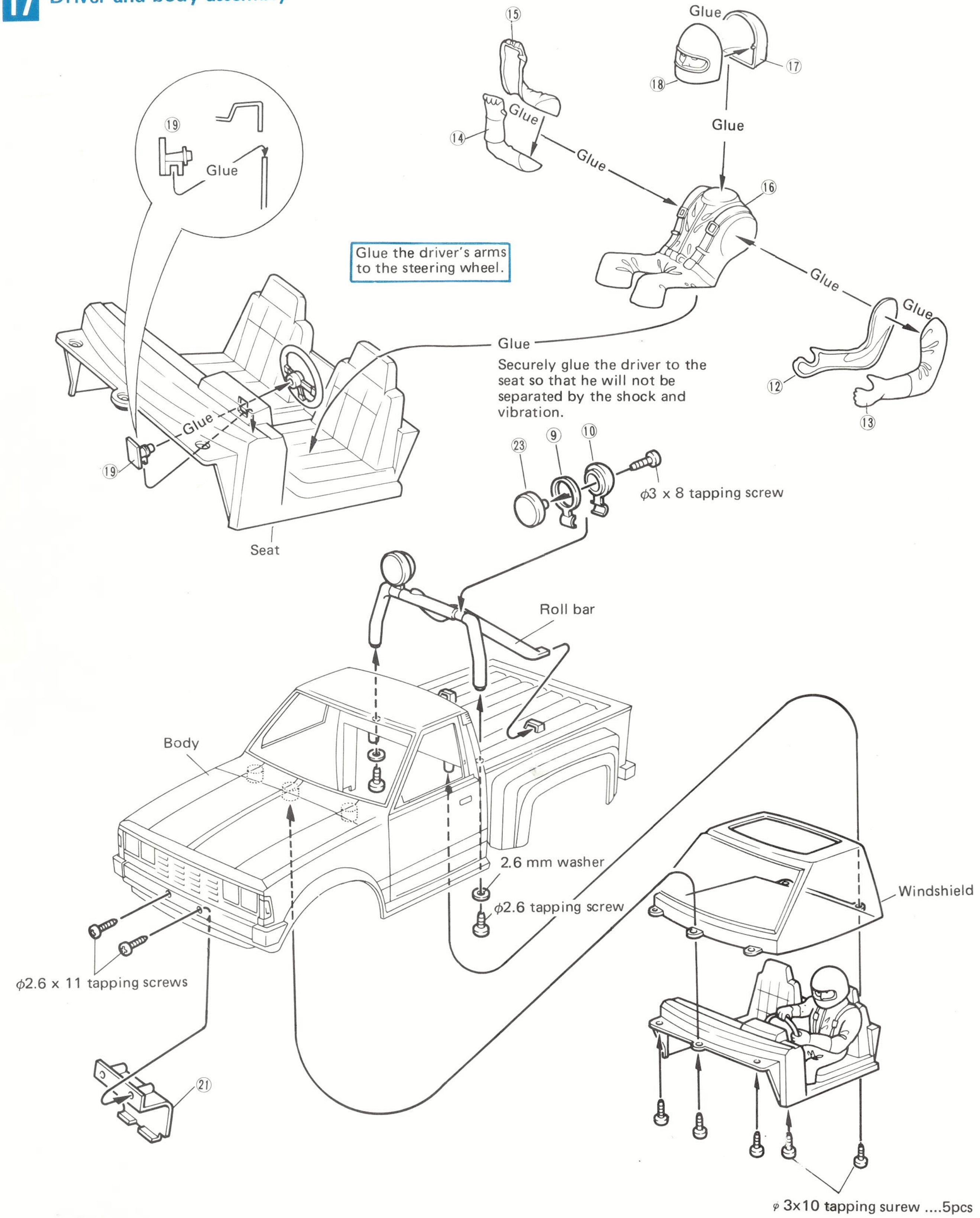
The contact must be in the neutral area when the controller connector is plugged in. Otherwise, the car may run out of control or the controller, battery, or motor may be damaged.



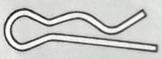
(Metal part actual sizes used on P. 12)

- 2.6 mm washer .... 2 pcs
- ϕ2.6 x 8 tapping screw .... 2 pcs
- ϕ2.6 x 11 tapping screw .... 2 pcs
- ϕ3 x 8 tapping screw .... 2 pcs
- ϕ3 x 10 tapping screw .... 5 pcs

17 Driver and body assembly

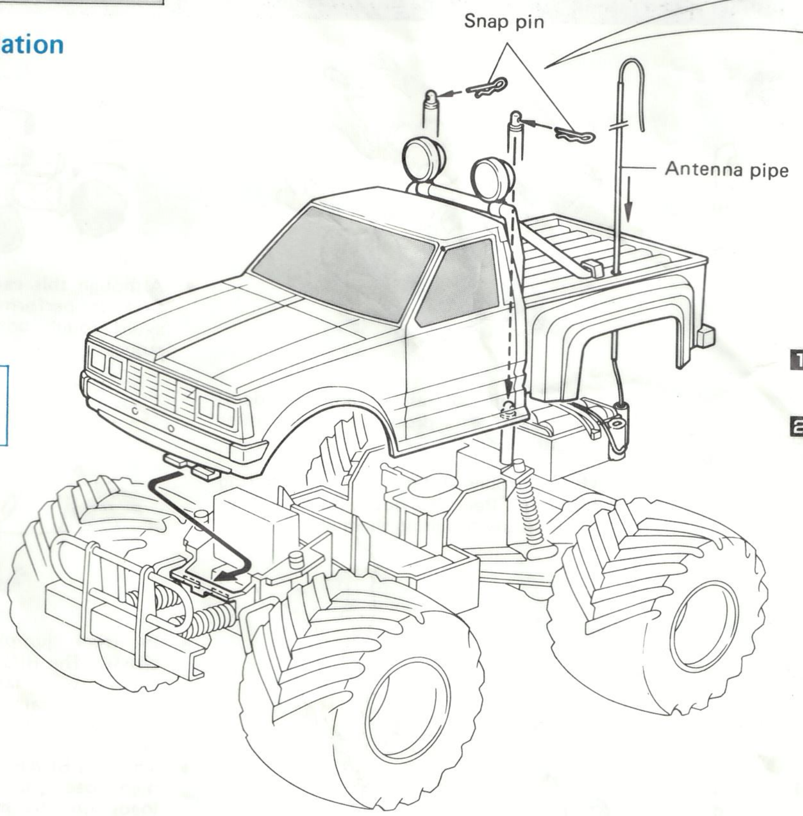


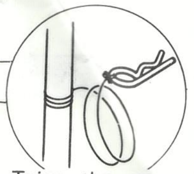
(Metal part actual size used on P. 13)



Snap pin . . . 2 pcs

18 Body installation





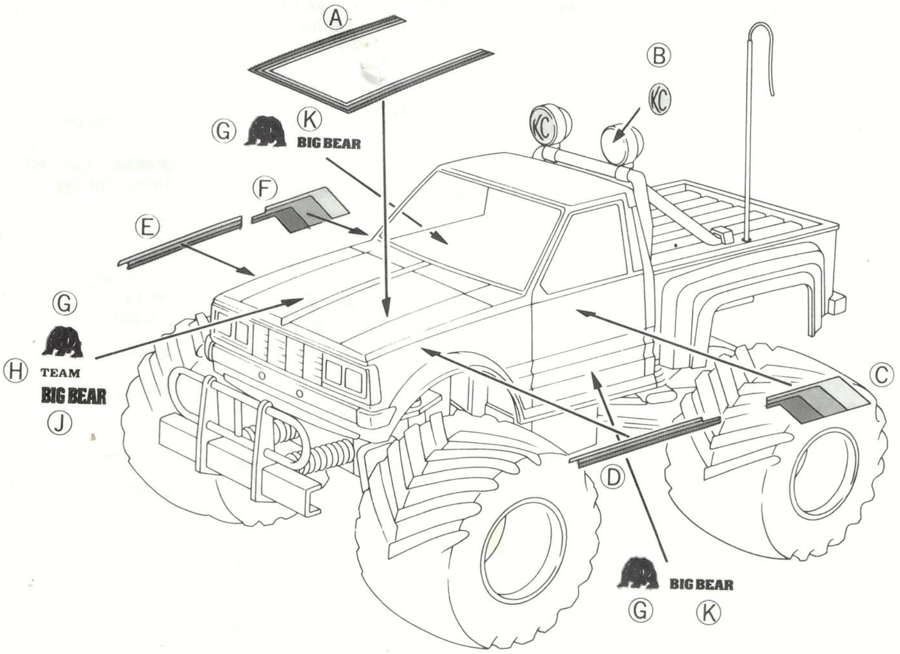
Tying the snap pins to the roll bar with a strong string is one way to keep them from getting lost.

Insert the front first.

1. Thread the antenna through the antenna pipe.
2. Press the antenna pipe into the support provided on the chassis.

19 Applying decals

*Apply the decals in the positions.



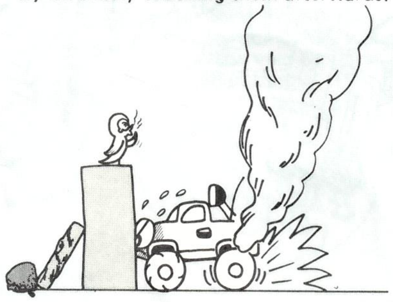
《 Handling precautions 》

BIC BEAR runs at high speed due to built-in tuning motor. Handle and operate with exreme care.

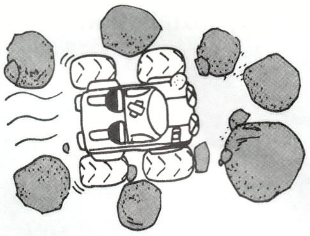
- Do not operate in a crowded location, in the presence of small children, or on roads.

- When the car is trapped in deep sand, return the transmitter levers to their neutral positions and turn the controller off.
- Avoid grassy areas as long grass may become wound on drive shafts.

- Avoid puddles areas as water may damage the motor or proportional controller circuits.
- The controller and motor heat up during operation. Becareful not to burn yourself by carelessly touching them afterwards.



- When the car encounters an obstacle, do not try to continue driving. The excessive load may burn out the motor.



- Although this car has outsized tires for excellent performance on rough surfaces, avoid rough areas with many sizable stones.

- Incorrect jumping may damage the chassis. The BIG BEAR's weight balance allows it to land beautifully if it is travelling straight at full speed prior to the jump. (However, avoid excessive drops.)
- The BIG BEAR's outsized tires provide a high road grip, but also impose great loads on the motor when the car is operated in sand and grassy areas. Avoid long periods of continuous operation under such conditions. (The motor will overheat and burn out so give the motor frequent chances to rest.)

<Checks before operation>

1 Are all screws and nuts tight? Check especially those securing the driving components.

2 Does the drive mechanism work smoothly? Place the car on suitable stand so that the tires do not contact the ground. Test-run the car for one or two minutes and check for faulty contacts of drive parts.

3 Does the controller function sharply? (See the manufacturer's instructions and Page 9 for controller adjustment.)

4 Does the steering operate correctly? If the car does not run straight, turn the steering lever trim toward the reverse direction of the car's drift. (See Page 8 for trim adjustment.)

5 Do the proportional controller batteries have sufficient power? The receiver battery life is shorter than that of the transmitter. Earlier battery replacement is recommended. (See Page 2.)

6 Are all lead connections tight? Faulty insulation or soldering may lead to shortcircuits. Repair with insulating tape (See Pages 2, 9, and 11.)

7 Is the drive battery properly recharged? (See Page 2.)

<Troubleshooting>

① The car does not move forward although the motor is operating. See Pages 5 and 6.

② Abnormal motor or gear sound. Rear wheels do not rotate smoothly. See Page 6.

③ The car does not respond properly to the controller operation or performs erratically. See Pages 5 and 6.

④ The speed control is faulty on the car does not shift into top speed. See Page 9.

⑤ The car does not run straight or steering response differs on the right and left. See Page 8.

⑥ The controller, drive battery, or lead overheats. See Pages 4, 5, 6, and 9.

⑦ Proportional controller operation seems faulty—servoes do not operate, for example. Check: (1) the battery charge, (2) battery connections, and (3) electrical continuity of all wiring including each leads and connectors. If the faulty operation is not corrected even after the above checks, contact your radio controller dealer for repairs.

<Checks after operation>

① Through maintenance after use is important to maintaining performance and prolonging the service life.

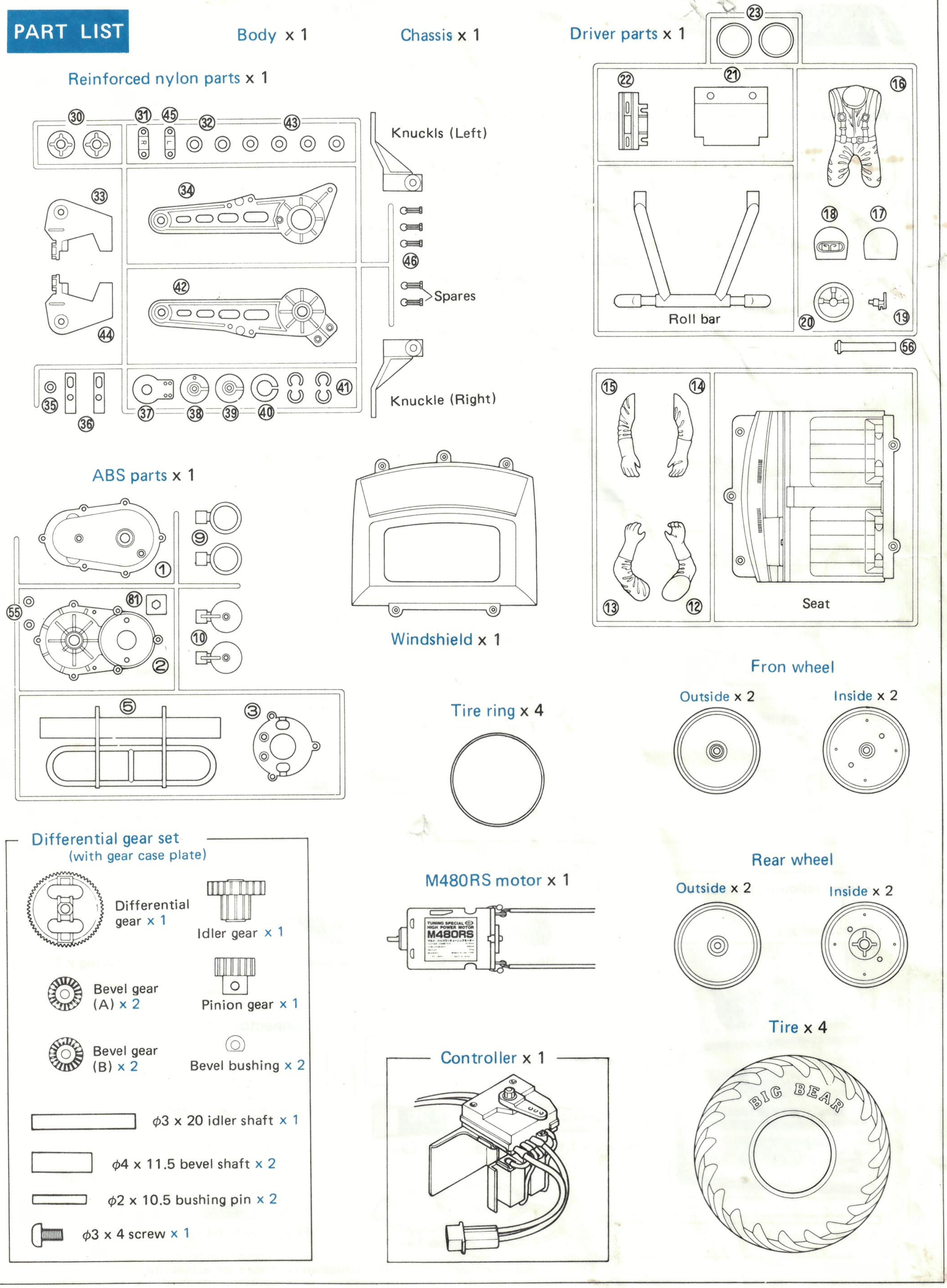
② Remove all accumulated dirt and sand.

③ Always remove all batteries.

④ Regularly apply grease to gears and other moving parts.

⑤ Check all screws for looseness.

PART LIST



Body x 1
Chassis x 1
Driver parts x 1
Reinforced nylon parts x 1
Knuckls (Left)
Spares
Knuckle (Right)
Roll bar
Seat
ABS parts x 1
Windshield x 1
Fron wheel
Outside x 2
Inside x 2
Tire ring x 4
Differential gear set
(with gear case plate)
Differential gear x 1
Idler gear x 1
Bevel gear (A) x 2
Pinion gear x 1
Bevel gear (B) x 2
Bevel bushing x 2
φ3 x 20 idler shaft x 1
φ4 x 11.5 bevel shaft x 2
φ2 x 10.5 bushing pin x 2
φ3 x 4 screw x 1
M480RS motor x 1
TUNING SPECIAL
HIGH POWER MOTOR
M480RS
Rear wheel
Outside x 2
Inside x 2
Tire x 4
BIG BEAR
Controller x 1

PART LIST

- Spare screws and nuts are included.
  ("ϕ3" means "3 mm in diameter.")

Metal part set

ϕ4 x 28 mm spacer x 2

Free ball x 3

Snap pin x 2

Body mount x 2

Oilless bearing x 2

Rod adjuster (Short) x 1

Rod adjuster (Middle) x 1

Rod adjuster (Long) x 1

Washer set

5 mm washer x 2

4 mm washer x 4

3 mm wahser x 8

2.6 mm wahser x 2

2 mm wahser x 16

3 mm spring washer x 8

4 mm spring washer x 4

Tapping screw set

ϕ3 x10mm tapping screw x 8

ϕ3 x 8 mm tapping screw x 10

ϕ2.6 x 11 mm tapping screw x 3

ϕ2.6 x 8 mm tapping screws x 2

ϕ2 x 9 mm tapping screw x 16

ϕ3 x 10 mm screw x 7

ϕ3 x 6 mm screw x 4

Rear shaft set

Rear shaft (Left) x 1

Rear shaft (Right) x 1

Shaft set

Front shaft x 2

Motor holder screw x 3

Front suspension shaft x 4

Rear suspension shaft x 2

Rear arm screw x 2

Front arm shaft x 1

Nut set

Partially nylon 4 mm locknut x 8

Partially nylon 3 mm locknut x 1

4 mm nut x 4

3 mm nut x 10

2 mm nut x 3

Spring set

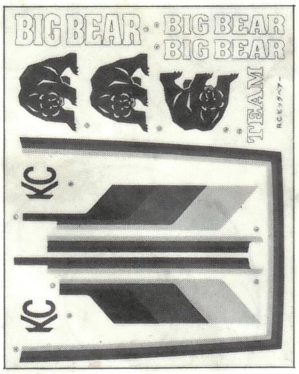
Rear suspension spring x 2

Fron suspension spring x 2

Bumper spring x 2

In addition following parts are included:

Decal sheet x 1



Heat resistant double coated tape x 1

Grease x 1 tube

Bond x 1 tube

Antenna pipe x 1

Rubber band x 3

Connector set

Intermediate connector ⑰ ⑯

Holder (Large) x 1

Holder (Small) x 1

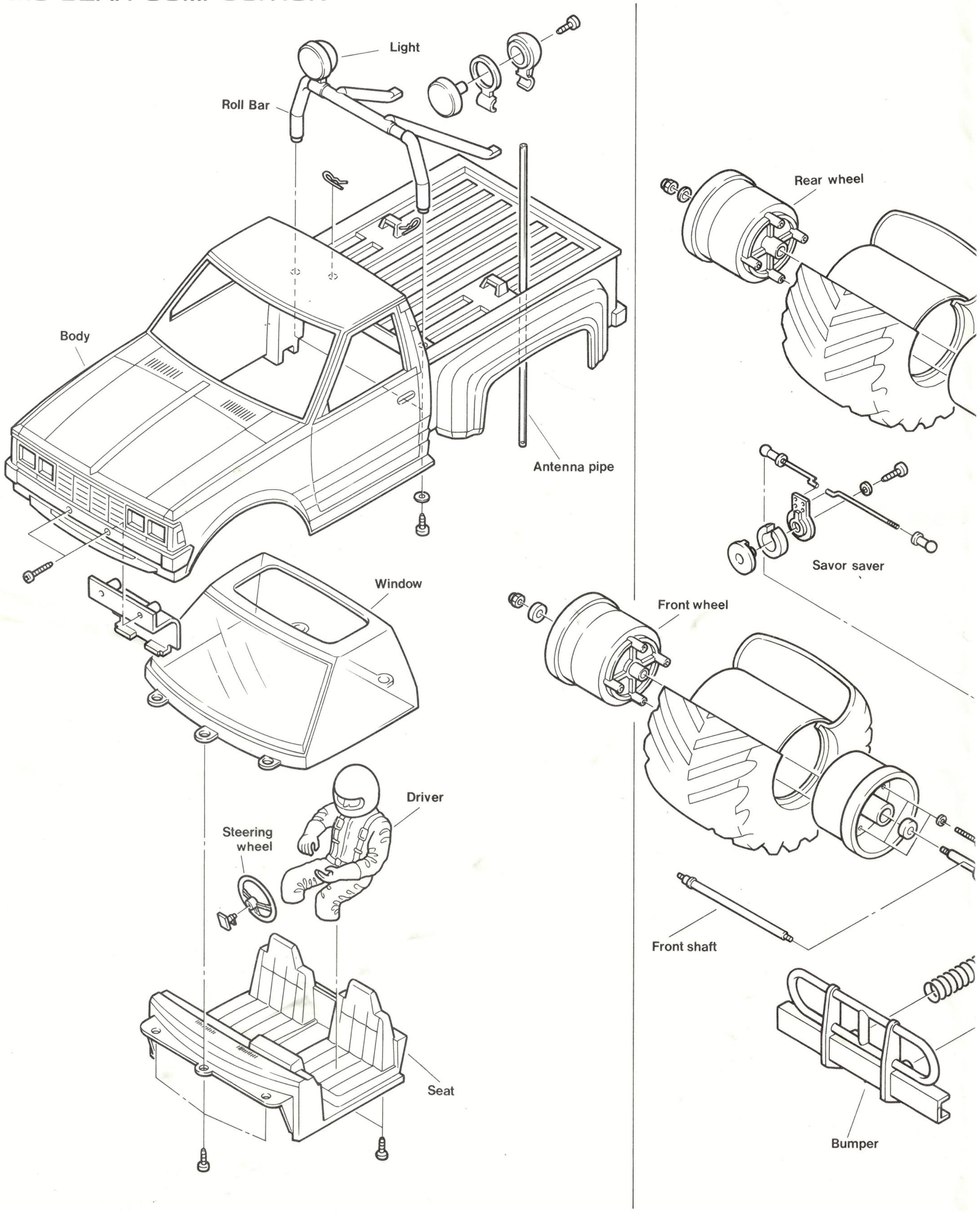
ϕ2 x 20 joint pipe x 2

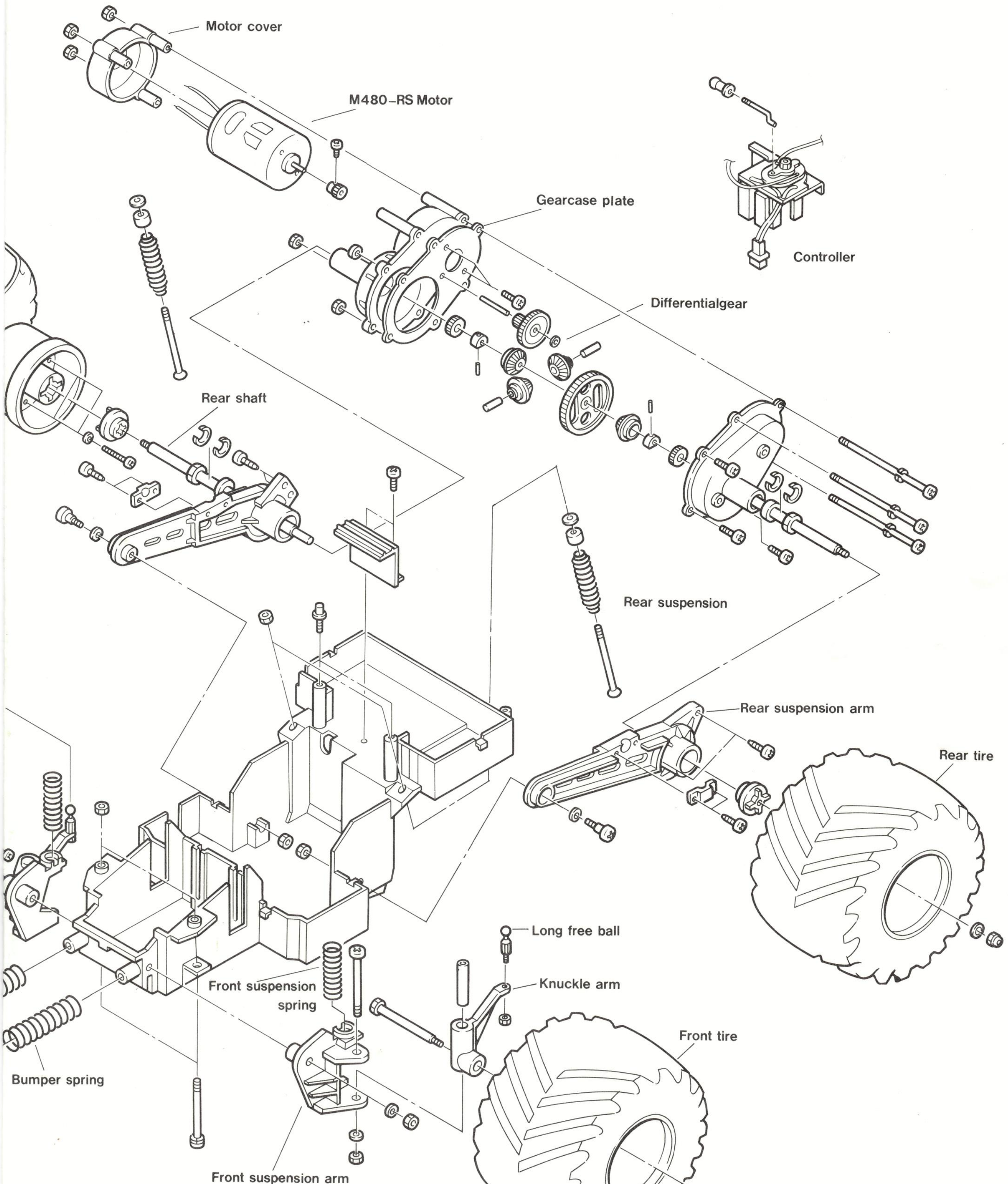
ϕ2 x 6.7 tapping screw x 1

Designs and specifications in this instruction brochure are subject to change without notice.

86'5

1/10 SCALE ELECTRIC R/C CAR ASSEMBLE KIT
BIG BEAR COMPOSITION




Motor cover
M480-RS Motor
Gearcase plate
Controller
Differentialgear
Rear shaft
Rear suspension
Rear suspension arm
Rear tire
Long free ball
Knuckle arm
Front suspension
spring
Front tire
Bumper spring
Front suspension arm

MARUI

HIGH SPEED RACING BUGGY
(30~50 km/h)

COMPLETE OFF ROAD PACK

NOTHING ELSE TO BUY

CONTAINS:

- ☐ 2 Channel Radio Control System
- ☐ High Speed Electric Motor
- ☐ Fast, rechargeable Nicad Battery Pack
- ☐ Quick Charger with Timer (12 Volt D.C.)
- ☐ Dry cell batteries for R/C system
- ☐ Comprehensive parts back-up
- ☐ Free technical advice
- ☐ Manufactured in Japan

RAPID ASSEMBLY KIT

OFF RO...
PACK

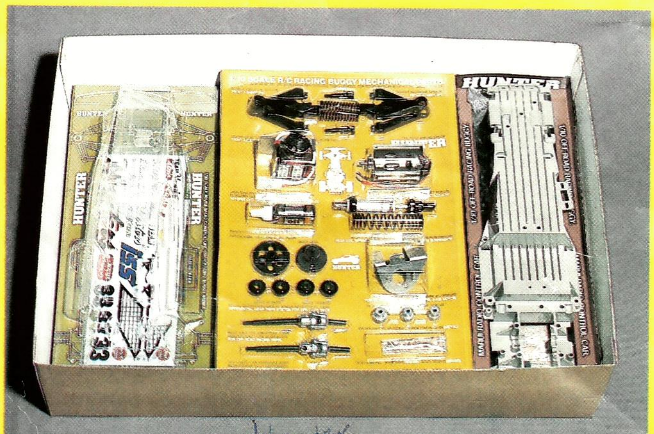
NOTHING ELSE TO BUY

CONTAINS:

- ☐ 2 Channel Radio Control System
- ☐ High Speed Electric Motor
- ☐ Fast, rechargeable Nicad Battery Pack
- ☐ Quick Charger with Timer (12 Volt D.C.)
- ☐ Dry cell batteries for R/C system
- ☐ Comprehensive parts back-up
- ☐ Free technical advice
- ☐ Manufactured in Japan

RAPID ASSEMBLY KIT

Big Bear



Hunter

IMPORTANT NOTE: Marui Buggy is in rapid assembly kit form & requires approximately 4–7 hours assembly

BIG BEAR DATSUN

IMPORTANT NOTICE

Please read the instruction book CAREFULLY and FULLY, a considerable amount of time and effort has been put into the assembly manual by the manufacturer.

Pay particular attention to the following:

- ☐ Speed Controller throw and positioning, see page 9 & 10 of instruction book, also enclosed information sheet.

- ☐ It is essential that you lubricate the differential gears with the lubricant supplied. Also ensure that you trim projections on the bevel gears, see page 6 of the instruction book.

- ☐ When installing the electric motor ensure that the red wire from the motor is at the top and the black wire at the bottom.

- ☐ For beginners and normal running we suggest you fit suspension spacer (part 55) to the rear springs, see page 7 of instruction book.

- ☐ Do not cut the receiver antenna wire, this will cause possible loss of control at distances, use the bobbin supplied to store excess length.

- ☐ Usually correct speed controller travel is attained by mounting the free ball on the fourth hole out from centre on the J.R. servo

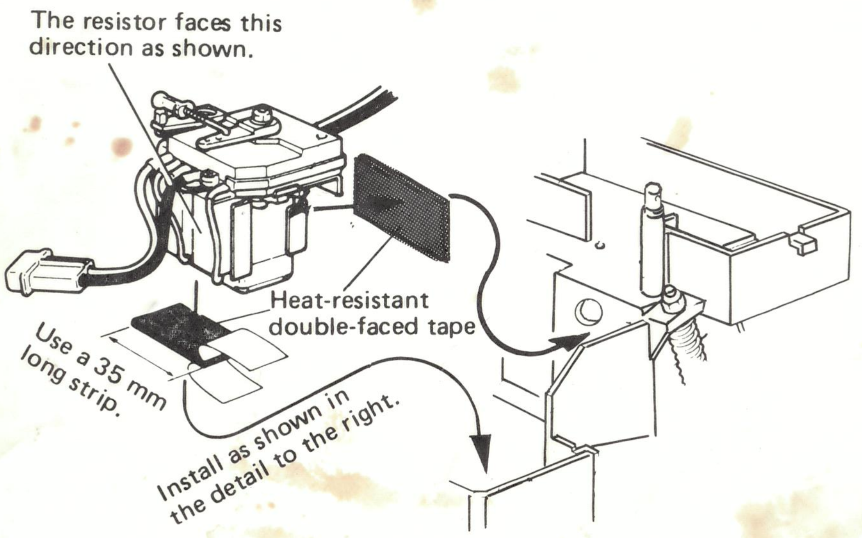
- ☐ From experience we recommend that the speed controller servo be mounted in the rear right hand corner of the chassis recess (looking from above). This positions the speed controller head almost directly below the receiver on/off switch. Maximum mechanical support is provided in this position.

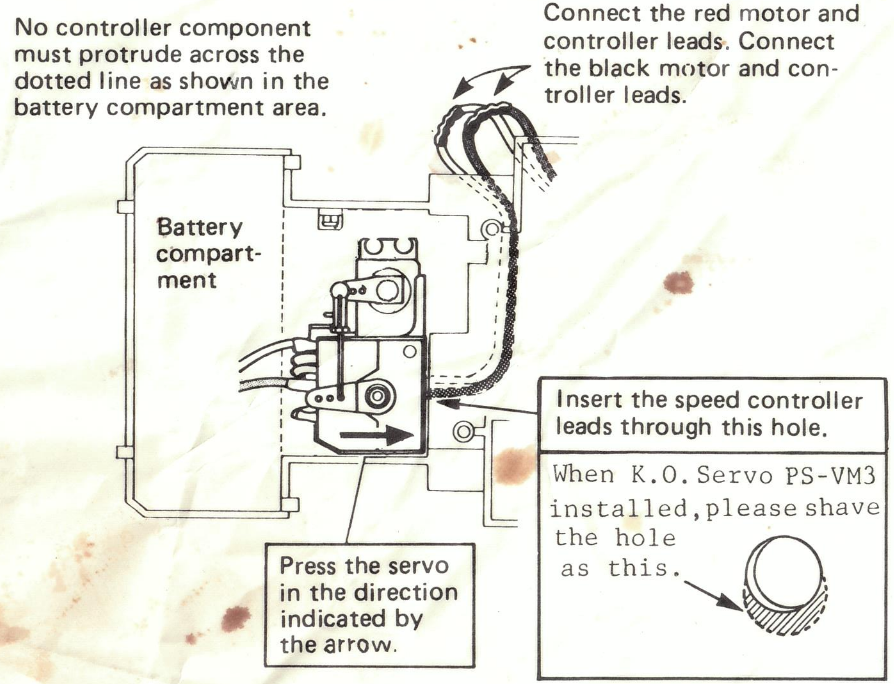
Thankyou for purchasing a Marui Big Bear, properly assembled and maintained your Big Bear will provide excellent service and reliability.

Happy Off-Road Running

REVISION

14 SPEED CONTROLLER INSTALLATION





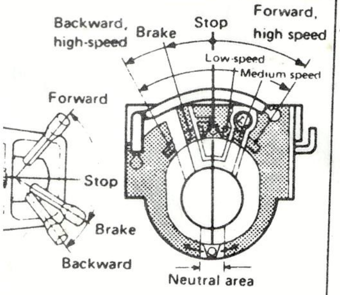
IMPORTANT INSTRUCTIONS

It is essential that the speed controller be correctly set for throw and positioning, please CAREFULLY read the instructions below, as well as those provided in the assembly manual.

Hints & Tips

- ☐ The speed controller switches large currents under harsh conditions, it must be considered a consumable item. With the correct amount of throw and proper installation your speed controller will provide excellent service.
- ☐ Insufficient travel will burn out speed controller and also damage mid speed / braking resistors on speed controller.
- ☐ Ensure that nylock nut on top of speed controller wiper is correctly tightened down.
- ☐ Lightly smear a **very thin** coating of petroleum jelly or vaseline over wiper plate.
- ☐ Use cable twist tie provided to tie red and white wires together — 60 mm from top of controller.

PLEASE STUDY CAREFULLY



'he controller may be damaged if it is used orrectly. The controller has built-in resistors ich may over-heat or burn if it is used only at v or medium speed ranges. Operate the model its high-speed sett ing as much as possible

\ large electric current is applied to the cont·er. The controller switch repeats turning ON IOFF the current, which shortens its life. Please der stand that it is a kind of consu mable part

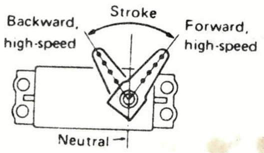
)o not touch the controller soon after ration as its resistors may be hot

)efective controller installation, or faulty tch movement resulting from incorrect switch d location or wire placement may cause the stors to over-heat and burn the bakelite tric component

void the use of the controller in a closed hanical box as it contains heat generating it ors.

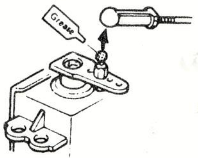
Stroke adjustment

Servo horn stroke differs by servo type. Perform a test to see if the switch arm moves all the way to its forward (high-speed) and backward (high-speed) positions by moving levers up and down. Adjust if the stroke is excessive or too small as shown on the right.

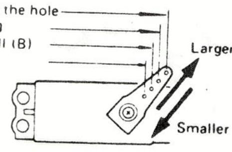


Perform stroke adjustment as follows (observe the order):

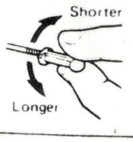
❶ Disconnect the ball end.

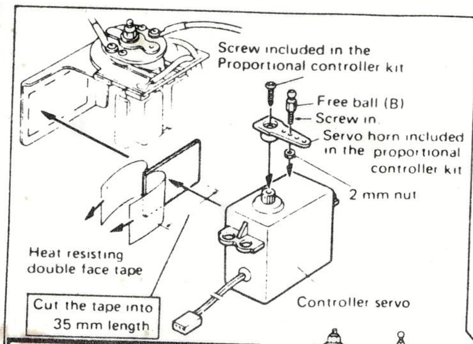


❷ Change the hole holding free ball (B)



❸ Adjust rod adjuster length and co nnect with free ball (B)

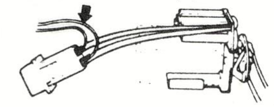




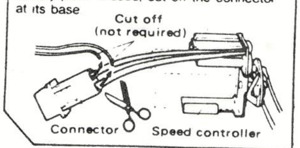
Cut the tape into 35 mm length

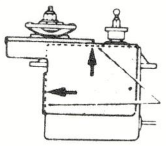
- Clean bonding area with thinner Methylated Spirits
- Apply sufficient pressure the controller servo.
- Do not touch adhesive face after removing the backing paper.

This is the cord of dual purpose for supplying power current to the GALAXY receiver and connecting to the 7.2V battery pack.

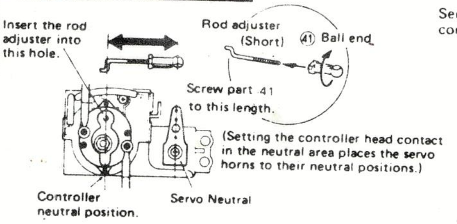


When the proposal set is used as it or a 6V battery pack is used, cut off the connector at its base

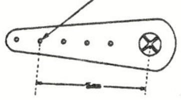




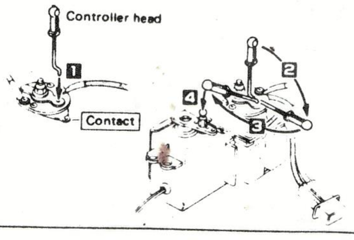
Press the servo toward the arrow, and affix to metal fittings tightly



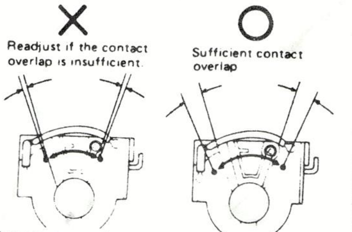
Servo horn (Included in the proportional controller kit)



Assemble in the order 1 through 4



«Contact point placement»



If the contact overlap is insufficient, shift the free ball toward the 15 mm hole on the servo horn.

TOKYO MARUI PLASTIC MODEL CO.,LTD.

Gear Ratio's

All of the ratios given are final drive ratio's including pinion, spur, and transmission. To find the gear ratio of your car consult the car transmission chart then use the following simple formula.

$$\text{Gear ratio} = \frac{\text{Spur gear}}{\text{Pinion gear}} \times \text{trans. ratio}$$

Dirt oval	Concete/Asphalt oval	Off-Road	On-Road
5.4 - 6.5	3 - 4.5	7.2 - 8.2	4.5 - 5.5

Trans Ratios

Dominator	RC10	M.I.P.	Yok.YZ-10	JRX2	Ultima	Laser
2.25	1.85	2.00	2.33	2.18	3.00	2.21

These gear ratio's are recommended starting points only. Due to variations in tire size, track conditions, batteries and car types you should experiment to achieve the best gear combination for your car and track.

Twister Goodies . . .

Part Number	Description	Price	Quantity	Total $
T-SHIRTS	**state size: (S) (M) (L) (XL) (XXL)**			
#617	White T-Shirt	$10.00	________	________
#618	Blue T-Shirt	$10.00	________	________
#622	Aqua T-Shirt	$10.00	________	________
DECALS				
#619	Twister Fluor. multi-color(3 Pc)	$4.50	________	________
#611	Twister Fluor. 4-colors(4Pc)	$4.50	________	________
#612	Cyclone Fluor. 4-color(4Pc)	$4.50	________	________
#613	Lg black Twister decal	$2.50	________	________
#614	Lg blue Twister decal	$2.50	________	________
#615	Lg pink Twister decal	$2.50	________	________
#616	Lg yellow Twister decal	$2.50	________	________
WORK MAT				
#5200	Red Twister Work Mat	$18.00	________	________

Total cost:________

Add $2.50 for shipping T-Shirts in U.S. (up to 2):________

Add $.65 for mailing Decals in U.S. :________

Grand Total:________

Name________________________________ Phone________________________

Address________________________ City____________________ ST______ Zip________

Send Check or Money order to: Twister Motors, 657 E. Arrow #H, Glendora, CA 9174

Questions? Write or Call theTwister Hotline "818-914-6177"

ECONO-STOCK INSTRUCTIONS

Thanks for purchasing an Econ-Stock motor. Econ-Stock motors are based on the proven Yokomo design with buil in heat sink endbells. To maintain good power and reliability please follow these instructions and clean your motor as ofte as possible, preferably after each day of running in exceptionally dusty or dirty conditions.

Caution: We do not recommend exceeding five volts while cleaning, testing, or breaking-in brushes as these moto operate at high R.P.M.'s and can easily be damaged if you exceed five volts in the unloaded condition.

BREAK-IN:

New motors do not require a long break-in period. A few minutes is all that is necessary to ensure good performanc The following procedure should be used whenever you replace the brushes.

STEP 1—Place two or three drops of oil on each motor bushing. These are oilite bushings and they are designed t absorb oil so they should be thoroughly oiled when new to prevent dry running. Push the shaft back and forth and spin a few times to allow the oil to spread between the shaft and bushing. After the break-in period, each bushing should g one drop of oil every day of running or each time that you clean it. Lack of oil will cause the motor to run excessively h resulting in premature bushing, brush, or commutator failure.

STEP 2—Connect the motor to a charger, power supply, or four-cell battery pack. The motor must be run at low spee three or four volts, for a safe break-in. We recommend using comm drops or a light shot of motor spray or contact clean on the commutator to assist break-in. Run the motor for five to six minutes, then spray off the commutator and disconne the motor. The purpose of a low-load and low-speed break-in period is to allow the metal to metal contact areas (bushin to-shaft and commutator-to-brushes) to wear against each other and remove any slight high spots, burrs or sharp edges th are left from manufacturing. If the motor is run at high speed initially, the brushes may bounce on the high spots of th commutator which could result in arcing and damage to the commutator or brushes.

CAPACITORS:

If you're going to race, you should install three capacitors to avoid radio interference. One from positive to the can, on from negative, to the can, and one from positive to negative. Use .1 MFD capacitors. If you are using an electronic spee control, follow the manufacturers recommendations for capacitors and make sure to use a fuse.

CLEANING:

Remove the motor from the car. Run the motor on a charger at three or four volts (low speed) or on a four cell batter pack. Spray motor cleaner or a good brand of residue-free electronic contact cleaner (non-flammable) liberally throug each bushing. Then spray the commutator and brushes through the end bell for a few seconds. Allow the motor to run f a minute or two to dry the bushings. Disconnect the motor and apply a small drop of oil to each bushing. A TWISTE Commutator Tool can be used to clean and polish the commutator without damage and will help restore lost performanc to worn motors or keep new motors running their best.

BRUSHES AND TUNING TIPS:

As in real race cars, each car and motor combination may require slightly different tuning to achieve the maximu results. Proper gearing is an important part of motor tuning. The supplied gear chart will give you a good starting poi for most car and track conditions. When in doubt, always start with a small pinion and go up in size until you achieve th run-time and performance required for your car and track. Running too small a pinion will only limit your top spee Running too large a pinion will make the car sluggish and cause excessive amperage draw, high heat, and premature mot failure. Since you cannot balance, rewind, or change the timing on stock motors, brushes are the best way to gain mo performance.

All Econ-Stock motors are supplied with soft compound brushes and heavy springs. These brushes and springs a designed to work well in average cars for both street and off-road conditions. However, if you're going to race, they ma not be the best for your particular track, car, or driving style.

Twister makes two good replacement brushes. The #602 medium brushes, and #601 hard brushes. We recommen using #601 brushes for normal replacement or #602 brushes for racing. The #601 hard brush will give good power an it's hard finish will keep the commutator in good condition resulting in long motor life and low maintenance. The #60 medium brush will give a little more torque and R.P.M. and is the fastest brush for stock motors. However, they are easil over-heated causing them to glaze and lose power. They should be cleaned and deglazed with a Twister commutat cleaning tool after every 2 or 3 runs and replaced after five or six runs.

In addition to hardness brushes come in several styles, full size, timed, or cut. #603 Twister Timed brushes have th trailing edges reduced. This improves power and R.P.M., but gives a little less run time. # 605 Cut brushes lower drag an amperage draw by cutting three sides of the brush. This substantially reduces the contact area without affecting the timin Cut brushes give better torque and run time than timed brushes with only a slight loss in high R.P.M. power.

A tuning trick used by many racers is to cut off 1/3 - 1/2 of the side of the brush for reduced drag without any timin change (see figure #1). We call this our #810 Pro-cut brush. It will give more run time and R.P.M. without sacrificing an top-end power and is usually the fastest combination.

After you have selected the proper brushes for your application, they should be soldered direct to the endbell plate We also recommend checking the alignment of the brush hoods with a Twister Alignment Bar #815. This guarante maximum electrical conduct and gives maximum power.

Each stock motor may vary a little as do cars, tracks and driving styles. If you follow our suggestions for gearing an tuning, you will have a very fast and reliable stock motor that will leave your competition in the dust.

Thanks again for purchasing an Econ-Stock motor.

If you have any questions or problems with your Econo-Stock motor or RC car, please call the "Twister Motor Hot Line 818-914-6177 or write TWISTER MOTORS and we will be glad to help !

QUICK CHARGER INSTRUCTIONS.

INTRODUCTION:

The Quick Charger supplied is to be used to rapidly recharge your Marui Buggies 6V or 7.2V Nicad Battery Pack. Please ensure correct Voltage Selection. The Quick Charger operates from 12 Volts D.C. - the most convenient source is your automobile's cigarette lighter socket. The power consumed by the Quick Charger is minimal (less than the car's parking lights when in operation). Please take time to carefully read instructions listed below. They are there for your assistance.

CHARGING THE 7.2v/1200 M.A.H. NICAD BATTERY PACK.

1. Plug the Quick Charger Connector into the Automobile's cigarette lighter socket. At this time alarm will sound. Reset timer to stop.

2. Connect Nicad Battery to the Red Battery Plug. Battery supplied in a discharged state in pack.)

3. Set timer to 30 minutes (the Quick Charger will automatically switch off the fast charger at the end of this period. The alarm will sound indicating end of charge.

4. NEVER attempt to recharge a partially charged Nicad Battery Pack. The Battery Pack must always be fully discharged before you attempt to recharge (the Nicad Battery is fully discharged when your buggy will only run slowly). If you attempt to recharge a partially charged battery serious damage with the possibility of the pack rupturing violently is likely to occur.

5. NEVER operate Quick Charger with the automobile's engine running. Excess voltage and excess currents may damage the Nicad Battery Pack.

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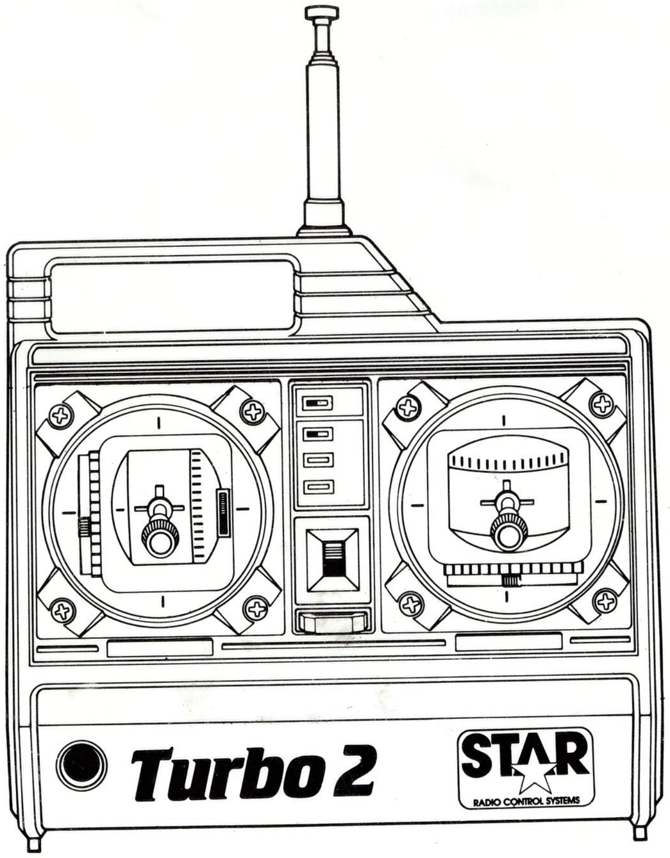
QCINST.DOC

Turbo 2

INSTRUCTION MANUAL



STAR
RADIO CONTROL SYSTEMS

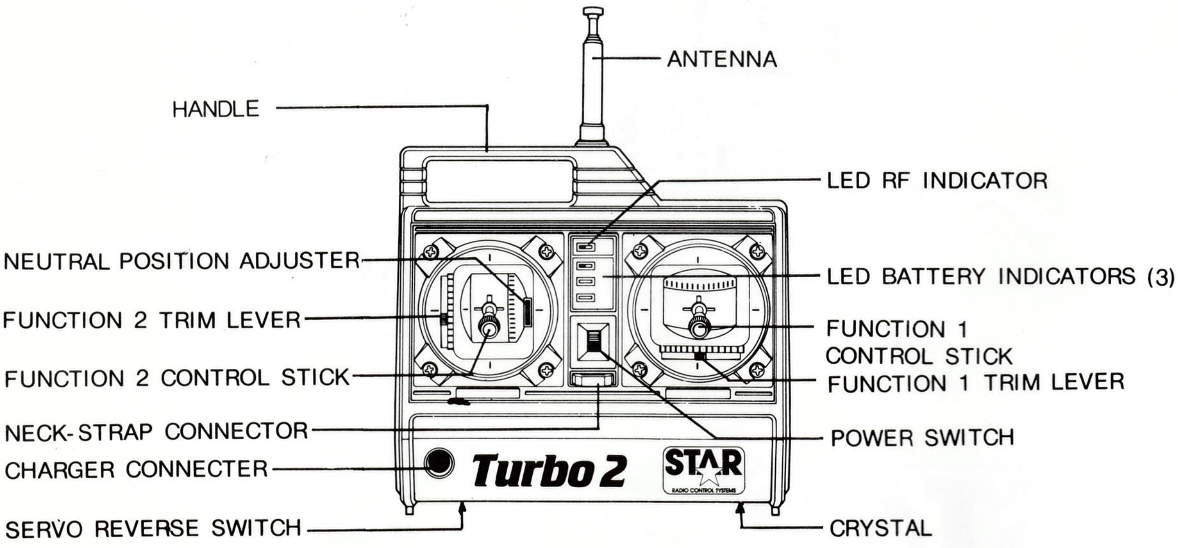
1 SYSTEM COMPOSITION

● Model	TURBO 2
● Transmitter	ST-222
● Receiver	SR-222
● Servo	S -402
● Accessories	Dry cell battery case and switch, servo grommets and mounting screws, extra servo arms.

2 TRANSMITTER

- Multi-purpose control stick assembly
- 2 selectable control stick length
- Adjustable neutral position (external)
- Spring or ratchet throttle control
- Servo reverse switch
- Charger connector for optional ni-cad
- LED RF output indicator
- LED battery indicator
- LED low-power flashing indicator
- Fuel resistant plastic case
- Neck-strap connector
- Extended transmisson range

TRANSMITTER LAYOUT



INTERCHANGEABLE CRYSTAL FOR TRANSMITTER AND RECEIVER

Channel changing is easily accomplished by plugging in crystals for the frequency required.

CONTROL STICKS: GIMBALS

A. Longer stick length: If longer stick length is desired, please replace plastic tips with longer set provided.

B. Spring defeat(must open case)

You may defeat the spring mechanism on the throttle stick by following simple steps as below.

1) Remove 4 screws in back
2) Place "SPRING DEFEAT" pin provided
   (copper color) on top of gimbal and fasten with enclosed screw(both packed together with longer plastic tips).
3) Remove spring(please keep this spring for future use)

C. ADJUSTABLE NEUTRAL POSITION

You may change the ratio of the throttle to make it 70% forward and 30% reverse simply by pushing adjuster. (located right side of throttle stick) down.

TURBO 2 TRANSMITTING FREQUENCIES.

You can operate your Turbo 2 radio control system with any other R/C system provided that they are on different frequencies or channel numbers. Always ensure that other transmitters on your frequency are switched off before attempting to operate your model. The transmitter and receiver should always be operated with their antennas fully extended. Do not shorten the receiver antenna as this will reduce the operating rango.

Channel Number	Frequency
12	29.745MHz
16	29.785MHz
20	29.825MHz
24	29.865MHz
28	29.905MHz
32	29.945MHz
36	29.985MHz

3 RECEIVER

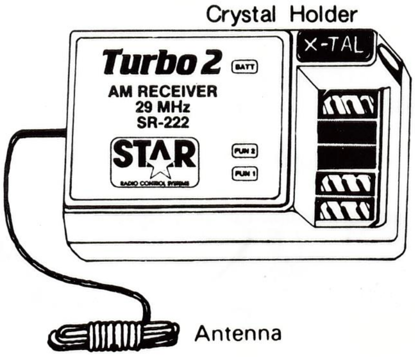
SPECIFICATION

- Small, lightweight, rugged, and high performance AM 2 channel receiver.
- Narrow band design using a narrow band ceramic filter for resistance of adjacent channel interference.
- Power requirement: 4.8V NI-CAD or 6.0 V AA alkaline battery ×4 shared with servo

The receiver should always be operated with its antenna fully extended, do not shorten the antenna as this will reduce the operating range.

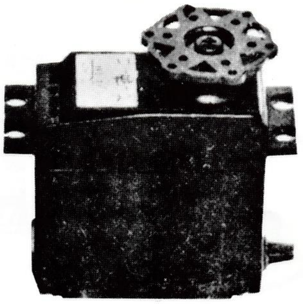
(NOTE : Nicad is prefered for more stable operation)

- Current drain : 15mA at 6 volts
- Dimensions : 2.37″×1.5″×0.75 (55×37×20mm)
- Weight : 1.5 oz(37g)



4 SERVO

This servo incorporates many advanced features, providing high performance and reliability. These heavy-duty & water/dust tight servos are designed for use with TURBO 2 digital proportional radio control sets.



SPECIFICATIONS

- Control system : +pulse control, 1,310 μs (1,520μs neutral)
- Operating angle : Rotary system, one-side 40° or greater (including trim)
- Power requirement: 4.8V or 6.0V (shared with receiver)
- Current drain : 6.0V, 6mA(at idle)
- Output torque : 42 oz-in. (3kg-cm)
- Operating speed : 0.24 sec/60
- IC : M51660L or NE544
- Dimensions : 2″×0.8″×1.9″ (52×20×49mm)
- Weight : 1.6oz(50g)
- Water-resistant
- High impact case
- Indirect drive for gear train protection

5 CONNECTORS

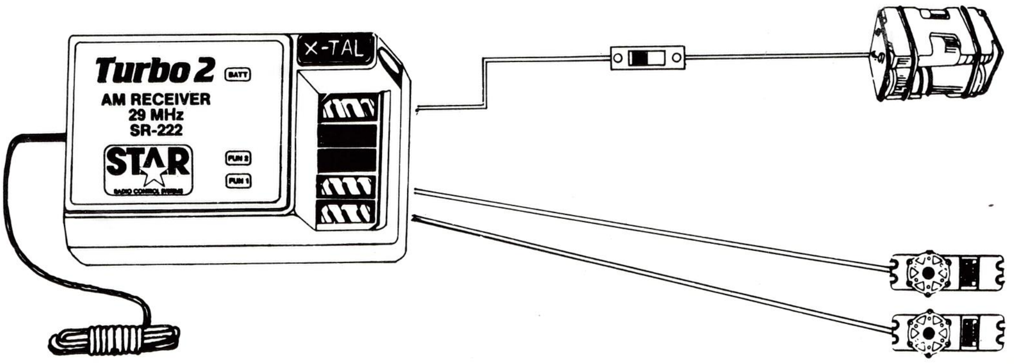
Connector usage

The connectors are polarized, that is, they will only plug in the correct way. When unplugging the connector from the receiver, it is recommended that you grip the connector, a gentle pull is all that is required to disconnect.

6 SWITCH HARNESS AND CONNECTING DIAGRAM

Beginners

If you are a beginner at radio controled modelling it is most important that you carefully read this manual before attempting to operate your R/C system. Pay particular attention to the section covering installation of the system.



Installation Hints

1. It is important that the radio system be correctly installed in your model
2. Wrap the receiver in foam rubber(1/8″ thick or greater), NOT foam plastic, for added protection.

3. Servos should be mounted on either hardwood bearers or a plywood tray with the mounting screws provided. Do not overtighten screws. Rubber grommets are supplied to reduce vibration.
4. Both servos must be able to move freely over the full range of their travel, make sure that linkages do not impede either servo travel. A stalled servo will drain the battery pack within a few minutes.
5. As the output shaft of the servo is splined, the servo output arm can be adjusted for the correct centering position.
6. In the case of powered model aircraft, mount the receiver power switch on the opposite side of the fuselage to the muffler, this protects the switch from oil. With other types of models, mount the switch in the most convenient position. Make sure that the switch knob operates freely, and is capable of travelling its full distance.
7. Range check. With your model sitting on the ground and with the transmitter antenna collapsed, check that your system works at a distance of approximately 15 feet.

(NOTE) Please peel off all protective films from metal labels immediately.